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THE SIXTY-SEVENTH ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN NEW YORK CITY, DATE TO BE NAMED.

The American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also meet in New York City in 1919.

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NEW YORK, N. Y.

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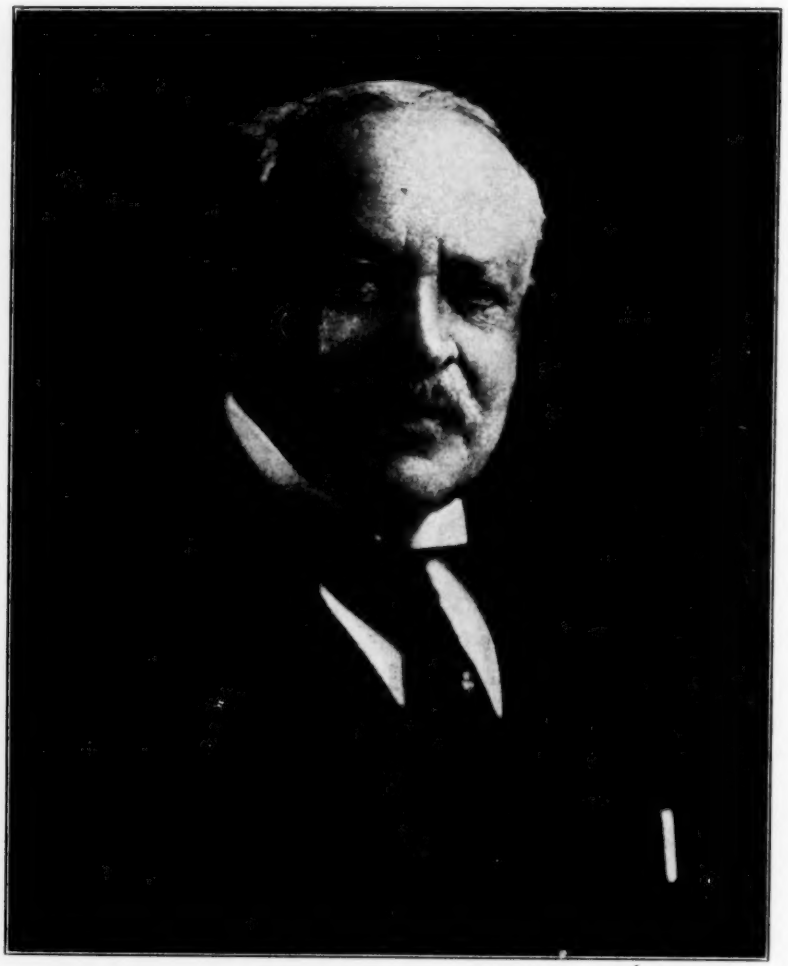

JOHN McKESSON, JR.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. VII NOVEMBER, 1918 NO. 11

JOHN McKESSON, JR.

Few Americans now living have had a longer, more intimate, more active and more virile an influence on any industry of the United States than has John McKesson, Jr., President of McKesson & Robbins, Inc., on the drug industry.

It is doubtful if any man in America has a wider knowledge of drugs and chemicals, of their sources of supply, the quantities of them annually produced, who controls them and how to get them.

Counting his apprenticeship in the house of McKesson & Robbins, of which his father was one of the founders this is John McKesson, Jr.'s 63rd year in the wholesale drug business of America. At 78 years of age his hand is still at the wheel—the master hand of a great institution—strong, alert and skillful seemingly as it has ever been.

Methodically as the ebb and flow of the tide, unconscious of growing years, with a zest for the day's work ahead of him that many a younger man might envy, he is at his desk each day at the stroke of the clock. A gentleman of the old school, disdaining ease, inured to hard work, you'll find him there in rain or shine in his little private office, answering cables from all parts of the world, directing replies to important mail, giving instructions over the telephone and advice and counsel to his subordinates, his sensitive fingers every second of the day on the world's drug and chemical pulse. With agents in every section of the globe, where drugs and chemicals abound, that little room for more than half a century has been within an hour's touch of all the world.

When on that fateful day in August 1914 word flashed into that room from Europe that the torch of war had been lighted in the world's greatest source of drugs and chemicals, there flashed back, quick as lightning, a message that to thousands of retailers, physicians and hospitals in America was vital. That message flashed across the Atlantic and Pacific in the most critical hour the American drug and chemical industry has ever known, sent hundreds of tons of crude drugs and chemicals to this country from every point of the compass. His foresight and initiative in this situation helped to ease a situation pregnant with

serious possibilities. What he did for the trade in 1914, he did in 1916 and 1917 for the Government, and when it called it found him ready with the materials it needed. Profiting by his experiences in the Civil and Spanish wars, he knew what Uncle Sam needed and anticipated it.

For 50 years John McKesson, Jr. has aggressively pushed and sought to popularize high grade American drugs in Europe, especially American botanicals, and has done much to extend their use. He was one of the first wholesalers in the United States to enter the pharmaceutical manufacturing field, and to make the whole world his market by engaging in an international business. In China he introduced packaged drugs with Chinese labels on them and in Central and South America with Spanish labels. The Governments of France, Italy, Russia, Greece and other nations of the old world have been his customers. He ships to Iceland and Cape Town; from New Zealand to Greenland and all the points between. His representatives cover the earth.

Once a year for many years Mr. McKesson himself has visited all the leading markets of Europe to study conditions at first hand. He knew the drug markets of the world by personal contact; whenever he moved—he knew accurately what could be done. From the first he has worked to give to American drugs, wherever sold, a tone of the highest quality. Quality has been his touchstone for 50 years. For it he has fought and made many sacrifices.

Starting with one building in 1833, the institution of which he is the head, under his leadership has grown into seven buildings, covering many acres of floor space and employing help now counted in the four figures. Under him and that of his energetic partner the late Daniel C. Robbins, many men now well known in the trade received their training and got their start, including Henry S. Wellcome of Burroughs, Wellcome & Co., Samuel W. Fairchild of Fairchild Bros. & Foster, George R. Hillier of George R. Hillier & Sons, Harry Hall of Hall & Ruckel, Joseph F. Glatz of Schering & Glatz, Chas. F. Ward of Ward, Close & Co., Charles McLaughlin of McLaughlin, Gormley King Co., George Hartford, and a long list of others.

Mr. McKesson joined the American Pharmaceutical Association in 1867.

E. G. E.

INDUSTRIAL ORGANIZATIONS.

General Charles Dick, a former Senator from Ohio writing in the *New York Commercial*, says:

"The era of compelled industrial competition will give to a better era of wisely controlled combinations. For thirty years it has been the fixed policy of the Government to prevent combination whenever it tended to restraint of trade, and to enforce competition. There was no distinction recognized between good combinations and bad combinations.

"The people, however, have seen a new light. The Supreme Court of the United States has discovered some good combinations, some of them so good, the court declared, it would be most unfortunate if such an efficient industrial organization should be destroyed. When the United States was forced by the necessity of war to take charge of industry and called on big business to fill war orders, it made no attempt to enforce competition. On the other hand, it encouraged combination, coordination and collaboration with a resulting increased efficiency in product and increase of output. It is inconceivable that we shall ever return to the unrestrained competition which once prevailed."

EDITORIAL

E. G. EBERLE, Editor 253 Bourse Bldg., PHILADELPHIA

PHARMACY ACKNOWLEDGED AN "ESSENTIAL SPECIALTY" OF ARMY MEDICAL PRACTICE.

THAT pharmacy is an "essential specialty" of Army Medical Practice has been acknowledged by the provision of a "pharmacy war course" for the Students Army Training Corps. Reports bearing on the subject will be found under "Correspondence." A number of schools are now engaged in educating and training several hundred young men in pharmacy according to a program which has been determined upon as best adapted for the needs of the Army. The subjects in which the enlisted men adopting this course are to be instructed include the branches taught in schools of pharmacy and, in addition, a study of War Aims and English Composition, and First Aid training.

Prior contention has been that pharmacists, as such, were not needed for the Army; they were not placed in the deferred classes nor assigned to duties for which they were qualified by education and training. Draft boards now may defer their enlistment if the needs of the community require that this be done, and further deference has been shown by giving enlisted men the opportunities of an education in pharmacy. These acts indicate a change of viewpoint relative to pharmacy or a conviction that pharmacists have in the past not been given due consideration.

If these courses had not been opened to prospective pharmacy students there would have been further grounds for criticism, and hence this argues that the action of the Committee on Education and Special Training deserves commendation. It must be borne in mind, however, that many pharmacists, as highly trained as the enlisted students will be, were not given the opportunity to serve in the positions for which they were specially qualified. It is clearly evident that very high appreciation of pharmaceutical attainments has been lacking, and the question of rank still remains, even for those who complete the "pharmacy war course." It is to be hoped that the indorsement given to pharmacy as an "essential specialty" of the Army medical practice will prompt the organization of a pharmaceutical corps as part of the Medical Department of the Army.

There is little satisfaction in the fact that in England about the same conditions obtain as in this country; there are, however, indications of improvement. A recent letter to the Pharmaceutical Society of Great Britain from the Director General of the British Army conveys the information that an Army Council instruction is to be issued embodying the principle of placing a pharmacist in charge of the dispensary of hospitals, and "it is hoped" that pharmacists thus posted will be given the rank and pay of sergeants. The question of higher rank

"is still under consideration." The same letter states that "arrangements have been made to enlist into R. A. M. C. all qualified pharmacists who may in the future be called into service."

When a pharmacist enters the Army and performs the duties of a pharmacist then certainly the service rendered by him is professional, and the fact that in many drug stores pharmacy is a small part has no bearing on the question of his rank or professional standing. The educated pharmacist would gladly discard most of the side-lines if the pharmacy would produce a sufficient income. Medical men usually have more influence with legislative bodies than druggists, but they seldom give strong support to the persistent efforts of pharmacists to secure legislation that will require graduation from a college of pharmacy as a prerequisite to practice pharmacy. If all states had "prerequisite" laws, then progress toward higher qualifications for pharmacists would naturally follow. Medicine will take a long step forward after the war, and it seems highly important that there be closer coöperation of the medical profession with pharmacy and more helpful encouragement given by the Government in order that an American materia medica may be further developed. With the beginning of the war our dependence on Europe for drugs was realized; pharmacy measured up to its responsibilities under trying discouragements and difficulties. The efficiency with which the drug industries met every demand made upon them has received favorable comment. As far as we know, there has been no attempt at profiteering and the Schools of Pharmacy or members of the faculties aided in one way or another in the maintenance of proper drug supply, or in training men for dispensing or hospital service.

There is a place for the drug store among our commercial activities and there is a real need for pharmacy. Theoretical ideas that pharmacy can at once be separated from the drug business should be absorbed by the purpose to provide greater and better opportunities for its practice. This cannot be done by discouraging those who earnestly seek to develop pharmacy and place it on a higher plane, nor by permitting merchants, on the one hand, to sell drugs without restrictions, nor, on the other, have physicians dispense medicines, which in many localities has made it absolutely impossible to carry on a pharmacy.

The progress of pharmacy is largely dependent upon medical practice and, reversely, the advancement of the latter will be sustained by progressive pharmacy. Every activity is endeavoring to profit by the lessons of the war, and the blood and treasure so lavishly poured out will have been in a measure wasted if humanity does not profit and benefit by the experience and knowledge gained on the battlefields and in the hospitals from the treatment of injuries and diseases and a study of the action and production of prophylactic and remedial medicinal agencies.

We are pleased that the indorsement has been given to pharmacy, by the

Committee on Education and Special Training, and hope that there will be a further expression of confidence in its possibilities resulting in the establishment of a pharmaceutical corps as part of the Medical Department of the U. S. Army.

E. G. E.

THE SPANISH INFLUENZA.

IT MAY not be out of place to record in these pages a reference to the prevalence of influenza which has recently become epidemic in many sections of the United States and has prevailed in Europe for a number of months. The death rate in some localities has been seven times that of normal and the number of cases correspondingly large. Frederick E. Niece, a member of the Association residing in Queens Village, Long Island, died of the disease, which he contracted while experimenting to obtain a preventative serum. Death claimed quite a number of physicians and pharmacists. Unfortunately numerous remedies were suggested for the treatment of the infection, the chief object being the profit on the sales. The spirit of real helpfulness, however, largely predominated.

At the Phipps Institute, Philadelphia, the influenza germ was identified by Dr. Paul A. Lewis as Pfeiffer's bacillus, while Dr. Randle C. Rosenberger, bacteriologist at the Jefferson Medical College, has not been able to find the distinctive influenza germ. His finding seems to agree with that of Dr. Ulrich Friedemann, of the Virchow Hospital, Berlin, Germany; he had not found the Pfeiffer bacillus, streptococci and pneumococci being the most common agents of the complicating pneumonias. Dr. Richard Pfeiffer, Breslau, reported the finding of his bacillus in only a few cases.

It is conceded by a number of bacteriologists that the symptomatology and complications of the present epidemic correspond with those of 1889–90. Pfeiffer's bacillus was discovered in 1892. Dr. Kolle reported from Frankfort under date of July 18 that up to that time he had failed to detect Pfeiffer's bacillus in any of the cases he had examined. In practically all cases there were found, however, large numbers of a Gram-positive coccus—often in a pure culture or in symbiosis with pneumococci. The diplococci tended to develop involution forms and to grow in very large chains in the condensation water. He regards them as agents of a secondary infection in the Spanish influenza which he states *may* not be identical with the pandemic influenza of 1889–1893. E. G. E.

CONDITIONS AFTER THE WAR.

IT CAN safely be said that the beginning of the end of the war is at hand. Matters affecting the drug business quite naturally enter into a discussion in this JOURNAL, of conditions after the war. Immediately after the beginning

of hostilities prices of nearly all drugs advanced, and as a result, an inventory of the average drug stock would have shown a large profit on the investment. The druggist who did not mark up his retail prices in response to the rising market lacked judgment, for such reasonable action could not be construed as profiteering. With the return of peace prices will decline, and it behooves dealers now to buy cautiously. As the value of drug stocks was increased by higher prices the inventories following the conclusion of peace will, in many instances, indicate a loss, for which those who have invested the profits of preceding years in Liberty Bonds will be prepared.

During the war period the cry has been shortage of help; hereafter for a time there will likely be an over-supply, and this may prove more disadvantageous than the previous condition by bringing about a return of unnecessary overhead expenses which were eliminated because employees could not be secured and, realizing this, the public did not complain though deprived of conveniences to which they had been accustomed. Extravagance is recognized as an American failing; we have willingly made sacrifices for the sake of winning the war; most of those who enlisted for the cause of the country did so with becoming patriotism; our soldiers suffered privations and hardships, without complaint; they endured their losses as heroes; but it is doubtful whether the lesson of thrift has been deeply impressed.

We owe a duty to those who served the country and the world; opportunities of education and employment must be given them when they return to civil life, and the drug stores of the country should bear their obligations in this respect in mind. The Government required many thousand employees in the war industries, who will be released, and they, too, have a claim on the public and must not be permitted to remain unemployed.

The return to peace conditions signifies a reconstruction period during which it has been said the mettle of America will be put to a test much more severe than that of the war, in which the armor of right and justice will protect us and only the might of mind will prevail. Of this period Dr. B. C. Hesse said in a prepared address for the Philadelphia Section of the American Chemical Society:

> "In the tense industrial, commercial, and financial world-wide struggle that is bound to ensue directly after the close of hostilities, success will in all probability fall in a greater measure to those who have, in advance, prepared a comprehensive workable plan adapted for immediate development and operation, and sufficiently elastic to allow of effective adaptation to changing or unforeseen conditions, than to those who have not so prepared themselves."

The United States has shown its ability to save a world from autocratic and military domination; after peace is established her statesmen, financiers, business men and educators must show their ability to comprehend a vast and compli-

cated situation, to devise measures and supply means to master, control, guide and shape industrial and educational affairs so that the country will hold its front rank among the nations of the world.

Successful competition by the United States with other nations seeking markets for their products will compel the adoption of more scientific methods than have in the past obtained, and to this end the Department of Commerce will become more important and extensive as a source of industrial data for business and manufacturing interests.

Scientific management has been developed as a result of the war and closer contact between labor and capital is now more highly valued. The wonderful achievements of this country would have been utterly impossible without the really big men with these views, who developed the conservation and production plans which with the other equally important promotions enabled the United States to change the course of events in Europe. In the reconstruction following peace it is important that Capital have the viewpoint of Labor and reversely and, above all, that the principle of brotherhood, "Do as you would be done by," be accepted and more generally applied among nations and individuals.

E. G. E.

CALOMEL ASSAY (U. S. P.) IMPROVED.

BY A. B. LYONS.

The U. S. P. assay for calomel is neat and often expeditious. Sometimes, however, the calomel is exceedingly slow to dissolve in the prescribed volumetric solution. Increasing the quantity of the iodine solution helps materially. As much as 75 mils of the solution may be advantageously used in place of the 50 mils prescribed.

The difficulty is, however, wholly overcome by the simple expedient of doubling the strength of the reagent. It is as well to prepare a special volumetric solution by dissolving in 50 mils of water 13 grammes of iodine and 20 grammes of potassium iodide, adding a solution of 80 grammes of potassium iodide in 150 mils of water and making up with distilled water to 500 mils, or a little less. Standardize to a fifth-normal strength on an accurately standardized tenth-normal sodium thiosulphate solution.

In the assay use 0.5 Gm. of the dried calomel, 5 mils of water and 20 mils of the reagent, with no additional potassium iodide. Solution of the calomel will be effected in a few minutes. Titrate the residual iodine with tenth-normal thiosulphate solution, remembering to reckon the quantity of iodine solution as equivalent to 40 mils of a tenth-normal solution.

FLUIDEXTRACT OF SQUILL.*

BY R. I. GRANTHAM AND H. C. COLSON, JR.

Some time ago we called attention to the fact that the official dose of Squill preparations was not in proportion to the toxicity required for them by the biological standards of the U. S. P. IX, and we further pointed out that the commercial fluidextracts vary considerably in toxicity. We have also noticed since that time that commercial preparations vary considerably in the amount of total solids (10–30 Gm. per 100 mils) and the percentage alcohol (37–55%) which they contain.

We have deemed it advisable, therefore, to ascertain the cause for these variations and to devise a proper method for making fluidextract of squill. The U. S. P. IX process for making fluidextract of squill prescribes that the drug in *No. 20 powder* be macerated and percolated with *two parts alcohol and one water*. After a *definite volume* of the percolate has been received, it is directed that the alcohol be distilled and the liquid concentrated to a *definite volume*. After allowing the residue to cool, the gum, etc., are precipitated with alcohol and the residue washed with a diluted alcohol (4 parts alcohol and 1 part water). The combined alcoholic liquids are *distilled to a definite volume* and finally enough dilute alcohol is added to make a fluid, each part of which corresponds to one part of drug.

In any process for making fluid squill, the object in view is to obtain a product, of which 1 mil fully represents the active and therapeutic principles of 1 gramme of the drug. The process, which accomplishes this purpose in the simplest, most direct way is of course the best. In our opinion, few persons would say that the U. S. P. IX process is not complicated, but it might be assumed by some that if the directions were carried out properly a uniform product could be obtained.

The difficulties which are encountered in applying the U. S. P. process are: (1) the use of No. 20 powder, which becomes so gelatinous that percolation cannot be carried out; (2) the regulation of the definite volumes in the first and second stages of the operation. Upon this control of volume depend the qualities, chemical and physiological, of the finished product.

Our first experiments were made to find out if squill coarser than No. 20 powder could be used to obtain a satisfactory product. Fluidextracts were therefore made in accordance with the following specifications:

I. Squill No. 20 powder was exhausted according to the U. S. P. IX process, but the drug became so gelatinous that percolation could be perfected only by mixing purified sawdust with the drug.

II. Squill, very coarse powder, U. S. P. IX process. Percolation was satisfactorily carried out.

III. Whole commercial squill U. S. P. IX percolation process, which was satisfactory.

---

* Read before Scientific Section, A. Ph. A., Chicago meeting, 1918.

The three preparations were examined chemically for total solids and alcoholic contents, and biologically for toxicity by both the one-hour and twelve-hour frog assay methods. The one-hour frog test was made strictly according to the method of the U. S. P. IX. The preparations were also examined by the Houghton twelve-hour frog method, except that in calculating the H. T. U. per mil, 200,000 rather than 100,000 H. T. U. per Gm. of Kombé Strophanthin was used. The M. L. D. and H. T. U. per mil for a standard F. E. Squill were assumed to be 0.0012 mil per Gm. frog and 80 H. T. U. per mil, respectively.

The chemical and biological tests on preparations I, II, and III are given in the following table:

TABLE I.

Fluidextract No.	Solid matter in 100 mils.	Alcohol % by volume.	Percentage of toxicity. 1-Hour frog.	12-Hour frog.	Ratio between 1-hr. and 12-hr. frog.
I	7.2	62.5	192.0	250.0	1:1.302
II	5.7	72.5	138.4	175.0	1:1.265
III	11.0	60.7	204.0	286.0	1:1.402

No. 20 powder causes considerable trouble during percolation and the data in Table I indicates that a coarse powder or even the whole commercial squill will give equally good products and at the same time facilitate the carrying out of the percolation process.

IV. This experiment was made to find out if it was necessary to have the finished product as strongly alcoholic as the menstruum which is employed to extract the drug, and which at the same time would retain the original toxicity. For this purpose, the alcohol from 100 mils of preparation No. III was reduced from 60.7 percent to 37 percent. This yielded a cloudy solution which was filtered. This preparation is designated as No. IV, and had 9.4 percent total solids, 37 percent alcohol and toxicities of 140.0 percent and 187.5 percent by the one-hour and 12-hour frog methods, respectively. It will be seen by comparison of assays on fluidextracts III and IV that only 1.4 percent total solids and 31 percent toxicity were lost, when calculated on the assumption that fluidextract No. III contained 100 percent total solids and toxicity, respectively. The lower toxicity may be due to the effect of the heat applied in reducing the alcoholic content.

Our next experiments were made in order to determine the proper solvent for extracting the drug. The following fluidextracts were prepared, using in each case very coarse squill:

V. 100 Gm. of squill was exhausted with hot water, the solution concentrated to about 60 mils and then sufficient alcohol was added to obtain 100 mils.

VI. Fluidextract was made according to the U. S. P. VII process. A product was obtained which separated into two layers (30 parts top layer and 70 parts bottom layer).

VII. The drug was extracted with 90 percent alcohol, the alcoholic solution was evaporated and the residue taken up with 50 percent alcohol. The fluidextracts thus prepared were examined as to the amount of solid matter and the percentage of alcohol which they contained, and they were also tested physiologically, both by the one-hour frog method and the twelve-hour frog method.

The following preparations, namely, VIII, IX, and X, were each made in triplicate, and are designated as (*a*), (*b*) and (*c*). Preparations (*a*) in each case were made from one lot of drug, and preparations (*b*) and (*c*) in each case, from a second lot of drug.

VIII. (*a*) (*b*) (*c*) Squill extracted according to the U. S. P. IX method.

IX. (*a*) (*b*) (*c*) 100 Gm. of squill was digested with two portions of hot water (750 mils and 250 mils). The mixture was strained through cheesecloth. The bulk of the strained solution was then evaporated to a syrupy consistence, 200 mils of alcohol were added, the mixture stirred well and the alcoholic liquid decanted. The combined alcoholic liquids were then concentrated and the residue dissolved in sufficient dilute alcohol to make 100 mils.

X. (*a*) (*b*) (*c*) Drug was extracted with 80 percent alcohol and then proceeded as under VII.

These preparations were examined chemically and biologically with results as recorded in Tables II and III.

TABLE II.

Fluidextract No.	Solid matter in 100 mils.	Alcohol % by volume.	Percentage of toxicity. 1-Hour frog.	12-Hour frog.	Ratio between 1-hr. and 12-hr. frog.
IV	9.4	37.0	140.0	187.5	1:1.340
V	36.0	38.0	78.5	97.8	1:1.245
VI	53.6	42.9	213.0	220.0	1:1.041
VII	3.4	50.0	120.0	132.2	1:1.110

TABLE III.

Fluidextract No.	Solid matter in 100 mils.	Alcohol % by volume.	Percentage of toxicity. 1-Hour frog.	12-Hour frog.	Ratio between 1-hr. and 12-hr. frog.
VIII.					
a	9.0	57.3	120.0	173.0	1:1.440
b	12.4	63.0	132.0	152.8	1:1.158
c	20.8	52.8	101.5	172.0	1:1.694
Averages	14.1	57.7	117.8	165.9	1:1.407
IX.					
a	29.2	39.6	83.5	133.4	1:1.596
b	12.4	38.0	126.6	116.0	1:0.917
c	20.9	37.0	95.0	101.4	1:1.066
Averages	20.8	38.2	101.7	116.9	1:1.149
X.					
a	16.2	50.0	128.0	153.8	1:1.202
b	13.1	51.6	165.0	105.6	1:0.640
c	14.8	49.5	97.8	114.4	1:1.170
Averages	14.7	50.4	130.3	124.5	1:0.957

DISCUSSION OF THE RESULTS.

The results given in Tables II and III show that water extracts the toxic principles of squill together with the gums and sugars which must finally be eliminated by precipitation with alcohol. By using 64 percent alcohol (U. S. P. IX solvent), we obtained the toxic principles, also the gums and sugars which must be removed by precipitation. Nothing was gained by the use of a 70 percent alcohol (U. S. P. VII 1890 solvent). Our experimental data show further that an 80 percent alcoholic menstruum gives a product of high toxicity and one in which the gums and a greater part of the sugars remain in the marc. The use of this solvent decidedly simplifies the unwieldy U. S. P. IX process and at the same time produces a fluidextract of squill containing a maximum of the therapeutic principles of the drug. By employing a 90 percent alcoholic menstruum, we obtained a product which was nearly as toxic and one which did not contain much

extractive matter. While the presence of gum, etc., does not greatly affect the toxicity of the preparation, they might as well be eliminated.

The U. S. P. IX process is capable of yielding a satisfactory product, and may be fundamentally correct. The process, however, is very unwieldy and evidently its practical application to large scale manufacture was not taken into consideration when it was designed. In the U. S. P. IX process, the volume of the original residue is difficult to control, hence by this process it is almost always impossible to obtain fluidextracts which are uniform in alcoholic strength and percentage of extractive matter.

While it is not within the scope of this paper to discuss the methods of biologic estimation of drugs in detail, we wish, however, to take this opportunity to say a few words regarding the relative merits of the two frog assay methods employed in this investigation.

A satisfactory biologic assay should give results which are comparable to chemical analyses in respect to accuracy, absolute as well as relative. The factor, which enters into all frog assay methods and which tends more than any other to prevent consistent and reliable results, is the rate of absorption of the drug. This variation in absorption may be due either to an idiosyncrasy of the test animal, temperature of medication (which should of course be kept constant) during the assay, or finally the nature and concentration of the drug itself. The 12-hour method practically eliminates this variability, as it allows sufficient time for complete absorption of the drug, regardless of the conditions which may be delaying absorption. As a result of this, the end-point in the 12-hour frog tests is never in doubt, that is, the animal is either dead or alive. On the other hand, the one-hour frog method of the U. S. P. IX leaves the interpretation of the end-point entirely to the experience and judgment of the operator. The degree and rate of absorption of the drug varies greatly in the one-hour frog tests and is the principal cause of the unreliableness of this method. While the 12-hour method takes longer to complete, the cost per assay is only half as much as for the one-hour method, viz.: ($0.60 as compared with $1.25).

It has already been stated in this paper, that in the 12-hour frog tests the percentage toxicities of the squill preparations were calculated on a basis of 200,000 H. T. U. per Gm. of Kombé Strophanthin. Repeated tests on samples of Kombé Strophanthin from the largest manufacturers have always shown that in the 12-hour frog test, the M. L. D. for K. Strophanthin is approximately 0.000,0005 Gm. per Gm. frog rather than the average M. L. D. of 0.000,0010 Gm. per Gm. frog given by some authorities.

It is, therefore, the greater consistency, reliability and accuracy of the 12-hour assay, when made from season to season and with different lots of frogs, that makes it preferable to the official one-hour frog test for biologic evaluations of heart tonic drugs, and it is the method which furnishes the basis for discussing the relative toxicities of our squill preparations.

SUMMARY.

1. A satisfactory fluidextract of squill can be made with a powdered squill coarser than No. 20.

2. When either a 64 percent alcoholic menstruum (U. S. P. IX process), water, or a 70 percent alcoholic menstruum (U. S. P. VII process), is employed, the toxic principles of squill are extracted together with the gums and sugars which must later be eliminated by precipitating with a stronger alcohol.

3. The most satisfactory menstruum for extracting squill was found to be an 80 percent alcohol. This solvent removes a maximum of the therapeutic principles and at the same time leaves the gums and the sugars in the marc. The use of 80 percent alcohol simplifies the preparation of fluidextract squill and the product which is obtained is more uniform and the cost of production is greatly reduced.

4. The 12-hour frog method is more satisfactory and accurate than the official U. S. P. IX one-hour frog method for the biologic estimation of the relative toxicities of fluidextract squill or similar preparations.

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COMMERCIAL VIBURNUM BARKS AND PREPARATIONS.*

BY ARNO VIEHOEVER, CLARE OLIN EWING AND JOSEPH F. CLEVENGER.

Among the domestic drugs which are collected rather extensively and used in medicinal preparations, mention must be made of two or three *Viburnum* species, namely *Viburnum opulus* L. (Cramp bark) and *Viburnum prunifolium* L. or *Viburnum lentago* L. (Black Haw bark). The demand for *Viburnum opulus* especially has been considerable during years past. The recent report in literature, referred to later, that *Viburnum opulus* was substituted by *Acer spicatum* L., to which the name cramp bark was given, therefore created considerable interest and suggested a collection of samples in order to verify the fact and the extent of the substitution. The survey was extended to the manufactured preparations and also to black haw bark and its preparations.

The substitution of *Acer spicatum* as "Cramp bark" for *Viburnum opulus* dates at least as far back as 1892. Here a bark obtained from a manufacturing house was submitted as "probably true Cramp bark, *Viburnum opulus*" to the Research Committee "C" of the Committee on Revision of the United States Pharmacopoeia (Sayre and Denniston 1898). The material, as we know to-day, however, consisted not of cramp bark, *Viburnum opulus*, but of maple bark, *Acer spicatum*.

The description which was given for cramp bark in the Pharmacopoeia VII and VIII, consequently was erroneous. In the latest (IX) revision of the U. S. Pharmacopoeia the description for this product has been omitted altogether, being given correctly now in the National Formulary (1916), with the omission, however, of the term "Cramp bark." Some dealers still list under the name "Cramp bark" or "So-called Cramp bark," the material obtained from *Acer spicatum*, and certain manufacturers appear to favor the application of the term to it.

In this connection it is interesting to note that leading pharmacognosists consider that the name "Cramp bark" applies to *Viburnum opulus* L. and not to *Acer spicatum* (Rusby, 1915, 1916; Kraemer, 1915; and Sayre, 1917). The following excerpts from an article on "Spurious Drugs" by John Uri Lloyd (1915), are of special interest:

"The use of *Viburnum opulus*, cramp bark, dates back to domestic medicine in the past century, its most conspicuous therapeutic introduction, perhaps, being in the Botanic Physician (1844), a work of 210 pages, by Dr. Elisha Smith, to which Dr. John King often referred in the first edition of his Dispensatory (1852). At that time, and for many years afterward, *Viburnum opulus* was employed in but small amounts outside the eclectic school of medicine. There was consequently no difficulty in obtaining, true to name, the moderate amount necessary to supply the demand for the drug. Came next a commercial demand for 'Viburnum,' instigated by proprietary preparations. *Viburnum opulus* was then the only drug recognized under the name 'cramp bark' (see the old American domestic remedy publications), and this demand for 'Viburnum' was abruptly stimulated. *Viburnum opulus* not being commercially very abundant, the drug practically disappeared from the market, the possible supply being insignificant in proportion to the amount required in commerce. It was then inexplicably replaced, under the name 'cramp bark' (which name originally applied to *Viburnum opulus* only), by the bark of *Acer spicatum*, or mountain maple, to which so far as I know, the name 'cramp bark' had not pre-

* Contribution from the Pharmacognosy Laboratory, Bureau of Chemistry, Department of Agriculture, Washington, D. C.

TABLE I.—EXAMINATION OF COMMERCIAL SAMPLES OF CRAMP BARK.

TABLE I.—EXAMINATION OF COMMERCIAL SAMPLES OF CRAMP BARK.

No.	Label.			Identity.	Part used.	Condition.		Quality.
	Popular name.	Scientific name.	Part employed			Physical state.	Wood present.	
1	Cramp bark	*Viburnum opulus*		*Acer spicatum*	Stem bark	Fine powder	Not excessive	Not U. S. P. spurious
2	" "	" "		" "	" "	Very coarse powder	" "	" " "
3	(so-called) Cramp bark	" "	Whole bark	" "	" "	Whole	Few small pieces	" " "
4	" "	" "		" "	" "	"	Considerable	
5	(so-called) Cramp bark	" "		" "	" "	"	Few pieces	" " "
6	" "	" "		" "	" "	"	Several pieces	" " "
7	" "	" "		" "	" "	Fine powder	Not excessive	" " "
8	" "	" "		" "	" "	Chips	Considerable	" " "
9	" "	" "		" "	" "	Very coarse powder	Not excessive	" " "
10	" "	" "		" "	" "	Small chips	" "	" " "
11	" "			" "	" "	Fine powder	" "	" " "
12	" "	*Viburnum opulus*	Bark	" "	" "	Chips	" "	" " "
13		" "		" "	" "	Coarse powder	" "	" " "
14	Cramp bark	" "	Bark	" "	" "	Chips	" "	" " "
15	" "	" "		" "	" "	Fine powder	" "	" " "
16	" "			" "	" "	" "	Not observed	" " "
17	" "			" "	" "	Whole	" "	" " "
18		*Viburnum opulus*		" "	" "	"	" "	" " "
19	Cramp bark	" "		*Viburnum opulus*	" "	"	Not excessive	U. S. P
20		" "		*Acer spicatum*	" "	Coarse powder	" "	Not U. S. P. spurious
21	Cramp bark	" "		" "	" "	Whole	" "	" " "
22	" "	" "		" "	" "	Small chips	" "	" " "
23	" "	" "		" "	" "	Fine powder	" "	" " "
24	" "	" "		" "	" "	Very coarse powder	Not observed	" " "
25	" "	" "		" "	" "	Coarse powder	Not excessive	" " "
26	" "	" "		" "	" "	Very coarse powder	" "	" " "
27	" "	" "		" "	" "	Coarse powder	" "	" " "
28	" "	" "	Bark	" "	" "	Chips	" "	" " "
29	" "	" "		" "	" "	Very coarse powder	" "	" " "
30	" "	" "		" "	" "	" " "	" "	" " "
31	" "	" "		" "	" "	Whole	" "	" " "
32	" "	" "		" "	" "	Very coarse powder	" "	" " "
33	" "	" "		" "	" "	Fine powder	" "	" " "
34	" "	" "		" "	" "	Small chips	" "	" " "
35	" "	" "	Bark	" "	" "	Chips	" "	" " "
36	" "	" "	"	" "	" "	"		" " "
37	" "	" "	"	" "	" "	"	Considerable	" " "
38	" "	" "		" "	" "	"	Not excessive	" " "
39	" "	" "		" "	" "	Very coarse powder	" "	" " "
40	" "	" "		" "	" "	Chips	Considerable	" " "
41	" "	" "		" "	" "	Fine powder	Not excessive	" " "
42	" "			" "	" "	"	" "	" " "
43	" "	*Viburnum opulus*		" "	" "	Chips	Considerable	" " "
44	" "	" "		" "	" "	"	"	" " "
45	" "	" "		" "	" "	Coarse powder	Not excessive	" " "
46	" "	" "	Bark	" "	" "	Chips	Considerable	" " "
47	" "	" "		" "	" "	Fine powder	Not excessive	" " "
48	" "	" "	Bark	" "	" "	Chips	" "	" " "
49	Cramp bark (genuine)	" "		*Viburnum opulus*	" "	Coarse powder	" "	U. S. P.
50	Cramp bark or Mountain maple			*Acer spicatum*				Not U. S. P. spurious

TABLE II.—EXAMINATION OF COMMERCIAL SAMPLES OF BLACK HAW.

No.	Label.		Identity.	Part used.	Condition.		Quality.
	Popular name.	Scientific name.			Physical state.	Wood present.	
1	Black haw	*Viburnum prunifolium*	*Viburnum prunifolium* about 82% *Viburnum lentago* " 18%	Root	Whole bark	About 17%	Not U. S. P. excessive wood
2	" "		*Viburnum lentago*	Root	" "	" 1.5%	U. S. P.
3		*Viburnum prunifolium*	*Viburnum prunifolium*	Stem		" 1.5%	"
4	Black haw		*Viburnum lentago*	Bark	Powder	" 1.5%	
5	" "		" "	Root	Whole bark	" 18%	Not U. S. P. excessive wood
6	" "	*Viburnum prunifolium*	*Viburnum prunifolium*	"	Granulated	" 2%	U. S. P.
7	" "	" "	*Viburnum* (*unofficial species*)	"	Whole bark	" 7%	Not U. S. P. spurious

TABLE III.—ON THE COMPOSITION OF SOME COMMERCIAL VIBURNUM PREPARATIONS.

No.	Label.		Tannin test.	Valerianic acid test.	Identity.
	Common name.	Scientific name.			
1	Fluidextract black haw	Fluidextractum *Viburni prunifolii*	Dark green	Positive	*Viburnum* species
2	" " "	*Viburnum prunifolium*	Medium green	"	" "
3	Black haw	Fluidextract *Viburnum prunifolium*	" "	"	" "
4	" "	" " "	Dark green	"	" "
5	" "	" " "	Light green	"	" "
6	" "	" " "	" "	"	" "
7	Fluidextract black haw	Fluidextractum *Viburni prunifolii*	Dark green	"	" "
8	Black Haw	*Viburnum prunifolium*	Medium green	"	" "
9	" "	Fluidextract *Viburnum prunifolium*	" "	"	" "
10	" "	" " "	" "	"	" "
11	Black haw fluidextract	" " "	" "	"	" "
12	Black haw	Fluidextractum *Viburni prunifolii*	" "	"	" "
13	Fluidextract black haw	*Viburnum prunifolium*	Light green	"	" "
14	Black haw	Fluidextract *Viburnum prunifolium*	" "	"	" "
15	Proprietary A		Very light green		*Viburnum* species
16	Cramp bark	Fluidextract *Viburnum opulus*	Medium green	Positive	*Viburnum* species
17	Viburnum	Viburnum	Light green	"	" "
18	Cramp bark	Fluidextract *Viburnum opulus*	Medium green	"	" "
19	Fluidextract cramp bark	Fluidextractum *Viburni opuli*	Deep blue	Negative	*Acer* species
20	" " "	Viburnum opulus	" "	"	" "
21	Cramp bark	Fluidextract *Viburnum opulus*	" "	"	" "
22	" "	" " "	" "	"	" "
23	" "	" " "	" "	"	" "
24	Fluidextract cramp bark	Fluidextractum *Viburni opuli*	" "	"	" "
25	Cramp bark	Fluidextract *Viburnum opulus*	" "	"	" "
26	" "	" " "	" "	"	" "
27	Fluidextract cramp bark	Fluidextractum *Viburni opuli*	" "	"	" "
28	" " "	Viburnum opulus	" "	"	" "
29	Cramp bark	Fluidextract *Viburnum opulus*	" "	"	" "
30	Proprietary B		Light blue		*Acer* species

viously been applied." * * * * In this connection we might emphasize the fact that true "cramp bark" is unquestionably *Viburnum opulus*, but undoubtedly the bark of *Acer spicatum* has long been about the only "cramp bark" on the general market. "As a historical record it may be added that the early eclectics used, under the names 'Cramp bark' and 'High cranberry' the bark of *Viburnum opulus* only, a shrub native to the East, and well known to them."

It was pointed out by Farwell (1913) that the bark of the mountain maple (*Acer spicatum*) was being substituted for cramp bark (*Viburnum opulus*). To verify this statement and to determine the extent of such substitution commercial samples of "cramp bark" were collected throughout the United States in 1915 and examined as to their identity.[1] The results of our observations are incorporated in Table I, from which it may be seen that of the fifty samples examined, forty-eight proved to consist of the bark of *Acer spicatum* L. The other two were derived from *Viburnum opulus* L. Zufall (1915) and Rusby (1916) also state that samples of "cramp bark" proved to be maple bark and F. Beringer, as well as H. Kraemer reported similar findings to meetings of local branches of the American Pharmaceutical Association.

A similar examination of commercial samples of bark of *Viburnum prunifolium* showed that six were derived from the official species, *Viburnum prunifolium* L., or *Viburnum lentago* L., while one was derived from an unofficial *Viburnum species* (Table II). Both tables, furthermore, show that samples bearing the same label were found in all degrees of physical state, from whole to finely powdered bark, some devoid of wood, others containing very considerable amounts.

In view of the fact that substitution was observed and especially that such a large percentage of the samples of cramp bark proved to be spurious, a survey was made of *Viburnum* preparations in general on the market, in order to ascertain if similar conditions prevailed. Samples were collected throughout the United States in 1916, and examined as to their identity. The results of this examination are incorporated in Table III. It will be noted that in every instance preparations of *Viburnum prunifolium* were apparently true to label. On the other hand, of the fifteen samples supposed to be made from *Viburnum opulus*, only three were found to give a positive test for *Viburnum*. The other samples gave the reaction for *Acer* species, and in view of our findings regarding commercial "cramp barks," were very probably prepared from the bark of *Acer spicatum*. In this connection it is interesting to note that recent preparations of a certain manufacturer gave positive tests for *Viburnum*, whereas earlier preparations of the same manufacturer gave a reaction for *Acer*, thus indicating that correction of the error had been made in one instance at least, since the attention of the trade was called to the substitution of *Acer spicatum* for *Viburnum opulus*.

On account of the great extent of the substitution of *Acer spicatum* for *Viburnum opulus*, it seems advisable to again call the attention of the trade to this fact and to point out easy means of differentiation between the two by simple chemical tests, as well as by macroscopic and microscopic characteristics. (See S. R. A. Chem. 20, Item 216, 1917.)

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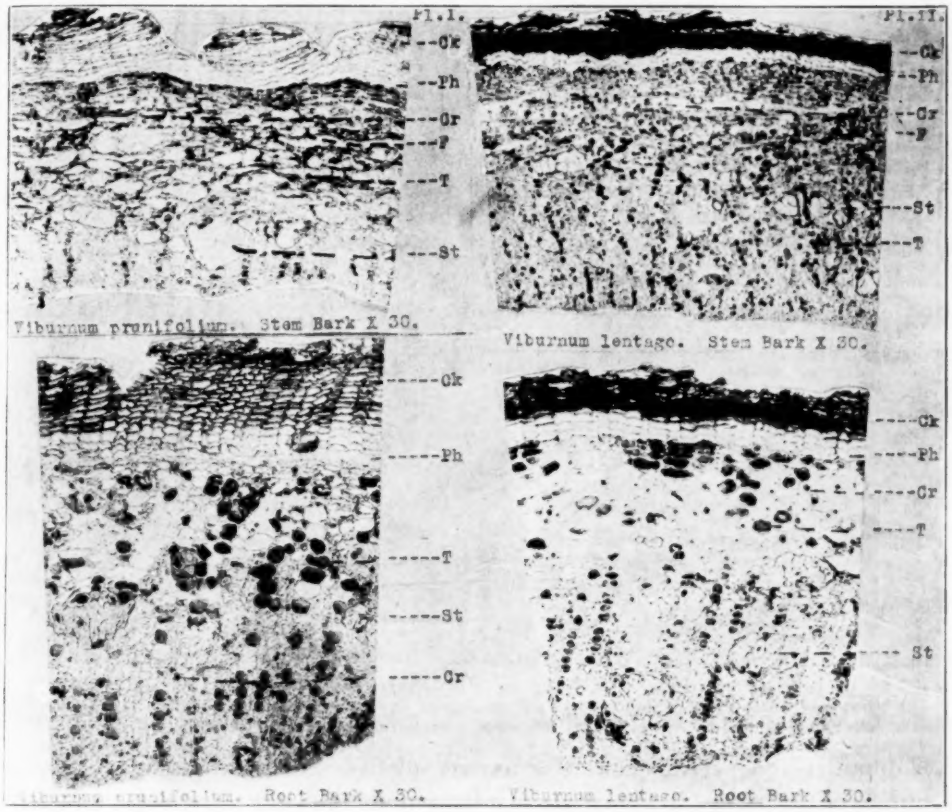
[1] In addition to authentic material collected by ourselves, authentic samples were obtained from C. J. Sargent, F. M. Crayton, and especially O. A. Farwell, to whom we wish to express our appreciation for their assistance.

The characteristics of the barks of *Acer spicatum* and of the official *Viburnum* species have been pointed out before in greater or less detail. Denniston (1898) has made a very thorough study of a number of American *Viburnums*, including *Viburnum opulus* L., *Viburnum prunifolium* L., and *Viburnum lentago* L., and has given accurate descriptions of the barks. Unfortunately, however, the material supplied to him as *Viburnum opulus* was in fact *Acer spicatum*, and his descriptions under the caption "*Viburnum opulus*" covers the main characteristics of mountain maple bark. Farwell (1913) described the morphology of the leaves as well as the histology of the bark of the American-grown *Viburnum opulus*, which he considers as *Viburnum opulus* L. var. *americanum Aiton*. We have as yet no evidence of any anatomical difference between the bark from *Viburnum opulus* and this variety *americanum*. Zufall (1915) suggested a revised official description of *Viburnum opulus*. His statement concerning the absence of oxalate crystals in maple and of fibers in cramp bark, as we understand from a personal communication, refers to the absence of oxalate rosettes in the one bark and the usual lack of fibers in the other. The author thus agrees with our findings.

The National Formulary IV (1916) gives a satisfactory description of *Viburnum opulus*, although omitting the name "cramp bark" altogether. The United States Pharmacopoeia VIII (1905) gives these names synonymously, but includes an erroneous description which applies to mountain maple instead of true cramp bark. Since these descriptions are easily accessible and generally satisfactory we consider it unnecessary to repeat them in detail. We desire only to point out the most striking characteristics useful for the identification and differentiation of the barks of the above-named species.

The bark of *Acer spicatum* is generally thicker and darker gray than that of *Viburnum opulus*, and usually has some woody tissue attached, while in *Viburnum opulus* the presence of attached wood is less frequent. The fracture of the bark of *Acer spicatum* is tough and very fibrous, due to the presence of large and numerous groups of long sclerenchyma fibers both in the stem and root bark. The fracture of *Viburnum opulus* is short and weak, since sclerenchyma fibers are usually absent in the secondary bark and are few and scattered in the primary cortex of the young bark. The bark of *Viburnum opulus* contains very numerous rosette crystals, scattered throughout the tissue of the inner bark, while *Acer spicatum* contains numerous prismatic crystals which occur in crystal fibers, generally accompanying groups of bast fibers. These are seen to best advantage in longitudinal radial sections. The root and stem barks of *Acer spicatum* are very similar in structure, while the root bark of *Viburnum opulus* differs from both of these and from its own bark as well, in showing almost an entire absence of stone cells or sclerenchyma fibers.

Viburnum prunifolium and *Viburnum lentago* both have short, weak fractures. The stem barks resemble each other very closely, but in the samples we examined the former had fewer and smaller groups of sclerenchyma fibers in the primary cortex and the groups of stone cells in the secondary bark were generally larger and more numerous. Their dimensions varied between 290–680 microns by 170–290 microns in cross section. The root barks also had a strong similarity to each other, but differed from the stem barks in that no sclerenchyma fibers were observed.

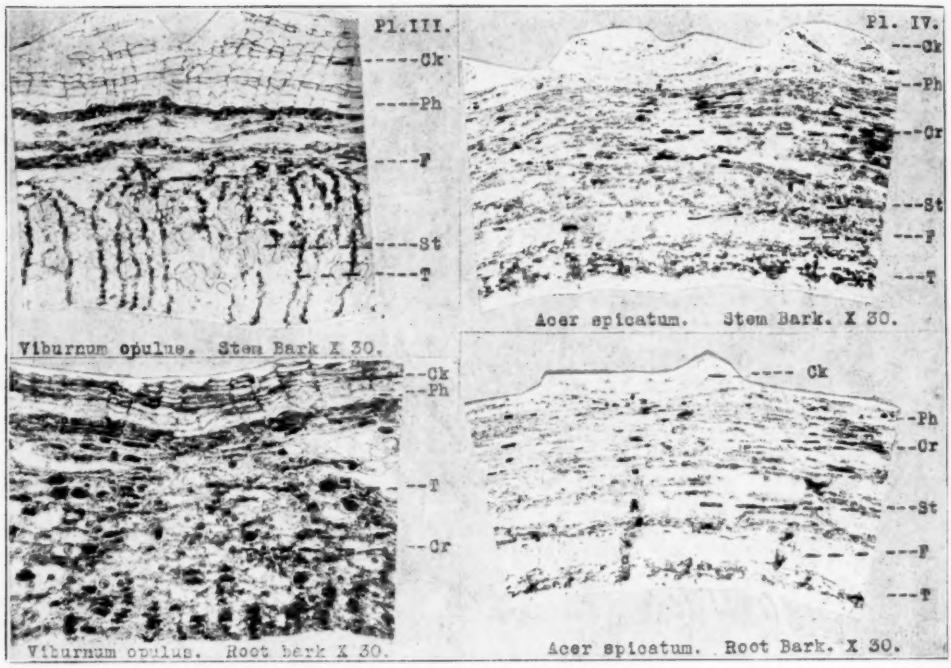


Viburnum prunifolium. Plate I.—Ck, cork; Ph, phellogen; Cr, calcium oxalate, crystals; St, stone cells; T, tannin cells; F, bast fibers. Plate II.—*Viburnum lentago*, abbreviations apply as in preceding.

The tannins are for the most part similarly located in all of the *Viburnum barks* described above. They occur chiefly in the medullary rays, but are also found scattered here and there in the parenchyma cells of the outer cortex. In the case of the *Acer* bark the latter type of distribution predominates. While tannins do occur also in the medullary rays they are possibly less numerous than in the case of the Viburnum barks, and are not quite so prominent. (See Plates I to IV.) The tannins of *Acer spicatum* can be distinguished from those of *Viburnum* species by their color reaction with freshly prepared one-tenth percent ferric chloride solution.

It was pointed out by one of us (Viehoever) at the October 1916, meeting of the American Pharmaceutical Association that both *Viburnum opulus* and *Viburnum prunifolium* contain tannins which give a green color or precipitate with iron salts, whereas *Acer spicatum* contains a tannin which gives a blue tannin or precipitate with iron salts. The reaction is given by both ferrous and ferric salts, but *freshly prepared* ferrous sulphate solution was selected because this solution possesses very little interfering color. This is advantageous, especially in the case of *Viburnum* preparations, where the color obtained is sometimes quite delicate.

In the case of the whole barks, the test was carried out by applying a drop



Viburnum opulus. Plate III.—Ck, cork; Ph, phellogen; Cr, Calcium oxalate, crystals; T, tannin cells; E, bast fibers; St, stone cells. Plate IV.—*Acer spicatum*, abbreviations apply as in preceding.

of dilute (1–1000) ferric chloride or ferrous sulphate solution directly to the inner surface of the bark. In the course of a few minutes a distinct green color appeared in the case of *Viburnum opulus* and *Viburnum prunifolium*, whereas a very deep blue to bluish black color developed in the case of *Acer spicatum*. The ground barks were tested by applying the reagent to the powder and examining in doubtful cases under the microscope.

Another simple and striking test is the red lignin reaction obtained in the case of maple bark, if a drop of phloroglucin-hydrochloric acid (phloroglucin 0.1 Gm., alcohol and concentrated hydrochloric acid 8 Cc., each) is applied to the inner side of the bark due to the numerous lignified sclerenchyma fibers in the bark. Some wood fragments are often attached to the barks; these have to be removed before making the test, which can, of course, also be applied to a section, preferably a longitudinal one. The phloroglucin-hydrochloric acid should be comparatively fresh and not too deeply colored.

The hydrochloric acid contained in the phloroglucin solution will furthermore develop, especially in the case of freshly collected *Viburnum* bark, the odor of valerianic acid, which is absent in maple bark.

In applying the tannin test to pharmaceutical preparations, the procedure was as follows:

Ten mils of the sample containing alcohol was diluted with about three volumes of water and shaken out with about 15 mils of ether. The ethereal layer was filtered and shaken gently in a test tube with an equal volume of water containing two drops of a *freshly prepared* saturated ferrous sulphate solution. A green color in the lower aqueous layer indicated a *Viburnum* species; a blue color indicated an *Acer* species.

In the case of preparations containing very small amounts of *Viburnum* accompanied by large amounts of interfering substances, it was necessary to evaporate a larger volume to dryness, take up with about 15 mils of 95 percent alcohol, dilute with water and proceed as usual.

St. John (1916) has pointed out that better results are obtained by shaking out with ether than with petroleum ether. We account for this by the fact that, although the tannins are insoluble in both petroleum ether and absolute ether, when a hydro-alcoholic extract is shaken out with ether, enough alcohol and water is taken up by the ether to carry along with it some of the dissolved tannins which are then tested for with the ferrous sulphate solution.

To confirm the results of the tannin test as applied to the pharmaceutical preparations, they were further tested in the following manner for the presence of valerianic acid, which is yielded by both *Viburnum opulus* and *Viburnum prunifolium* (Wehmer, 1911):

A small portion (several mils) was made alkaline with dilute sodium hydroxide, boiled to expel most of the alcohol, acidified with dilute sulphuric acid and warmed. In every instance where a *Viburnum* species had been indicated by the tannin test, the characteristic odor of valerianic acid developed.

In order to confirm the presence of valerianic acid, in one instance a larger amount of the preparation was neutralized with sodium bicarbonate, evaporated on a steam bath, acidified with dilute sulphuric acid and distilled with steam. The distillate was saturated with salt, shaken out with ether and the ethereal solution evaporated on the steam bath until the odor of ether was no longer perceptible. The remaining liquid was distilled and fractionated. It consisted largely of isovalerianic acid boiling at 170° and also probably contained a very small amount of normal butyric acid (b. 162–3). The isovalerianic acid was identified further by the microchemical characteristics of the copper, zinc and mercury salts (Behrens, *Mikrochemischen Analyse*, 1897). For this purpose the fraction containing mainly isovalerianic acid was treated with varying concentrations of solutions of copper acetate, mercuric nitrate, and zinc nitrate, the latter yielding the best results. When a small amount of alcohol was added and a too rapid evaporation was prevented by carrying out the reaction in a moist chamber, the crystallization was facilitated. Notwithstanding this, considerable difficulty was experienced in obtaining the copper salt, probably due to the presence of a small amount of butyric acid which is known to interfere with this reaction. While characteristic crystals were obtained with all three reagents, the least difficulty in obtaining satisfactory results was experienced with the zinc. The characteristics of the crystals obtained are shown in Fig. 1. The butyric acid was indicated by the development of an odor resembling pineapples,

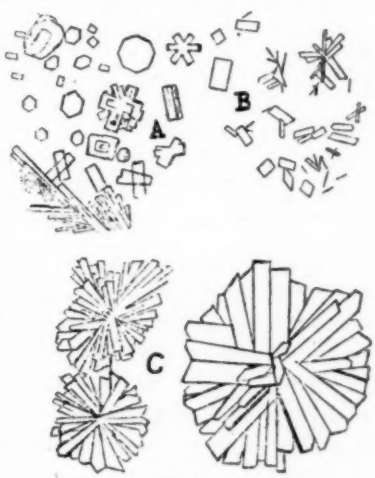


FIG. 1.

A. Copper valerianate. × 130.
B. Zinc valerianate. × 130.
C. Mercury valerianate. × 130.
After Behrens.

due to ethyl butyrate, when a drop of the first fraction was heated with several drops of ethyl alcohol and one drop of concentrated sulphuric acid. The material at hand was insufficient to prepare salts of the acids for further macroscopic confirmation.

SUMMARY.

(1) The bark of mountain maple (*Acer spicatum*) was found to be almost entirely substituted for true cramp bark (*Viburnum opulus*).

(2) All samples of black haw (*Viburnum prunifolium* or *Viburnum lentago*) proved to be genuine with the exception of one, obtained from a non-official *Viburnum* species.

(3) The preparations of black haw were made from *Viburnum* barks, while those of cramp bark were mostly manufactured from *Acer* species.

(4) The tannins in the barks give different color reactions with iron salts; blue in the case of *Acer* and green in that of the *Viburnum* species. These reactions can be used to distinguish the barks as well as their preparations.

(5) The tannins are distributed in the parenchymatic tissue, but can most easily be seen in the medullary rays.

(6) Maple bark can furthermore be readily distinguished from the Viburnum barks by the intense red coloration when the inner bark is treated with phloroglucin-hydrochloric acid solution; in the case of *Viburnum* barks, more than a faint reaction, if any, is rarely obtained.

(7) Among the differentiating tests of interest are those which were used to obtain and identify valerianic acid, yielded by the *Viburnum* barks but not by the *Acer* barks.

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WILD ANTHEMIS—A POSSIBLE MATRICARIA ADULTERANT.*

BY C. W. BALLARD.

Roman Chamomile or *Anthemis nobilis* L., was official in a previous edition of the U. S. Pharmacopoeia and this authority specified that the drug be obtained from cultivated plants. The product of wild growing plants contains more volatile oil and bitter principles. It is probably more active than the cultivated product. As the drug is used almost entirely as a carminative, the milder and more agreeable flavor of the cultivated flowers has resulted in their displacing wild anthemis. It is recorded that anthemis infusions will, in some instances, cause nausea and it is probable that if wild anthemis were used in their preparation this undesirable property will be more marked.

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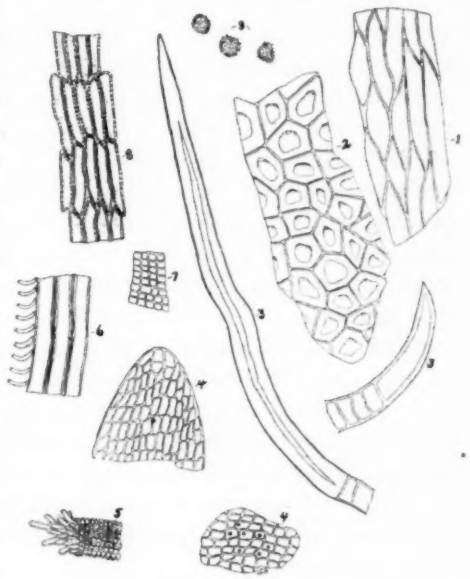
* Prepared for Scientific Section, A. Ph. A., Chicago meeting, 1918.

The writer recently had occasion to examine a sample of wild anthemis which was first offered under the designation "chamomile" or "Spanish chamomile." The title "chamomile" is manifestly erroneous, as in the present revision of the Pharmacopoeia the terms "chamomile" and "wild chamomile" are stated as synonyms for matricaria. The title "Spanish chamomile" is also untenable because the National Dispensatory reserves this as a synonym for *Anacyclus Pyrethrum*. The materials of the sample were finally classified as *Anthemis nobilis* (wild), by different pharmacognosists. This article is rarely seen upon the market and because of its appearance it would hardly be accepted in crude drug circles as Roman chamomile, although it might be mistaken for the so-called Hungarian or German chamomile (Matricaria). The drug trade has been accustomed to handling the cultivated anthemis which was formerly official; their customers recognize this variety as Roman chamomile and possibly know no other.



Wild anthemis (× 65). 1, Bract tissue. 2, Petal tissue from ligulate floret. 3, Trichome from bracts (× 80). 3′, Trichome from stem. 4, Petal tissue of disk florets. 4′, Petal tissue with rosette crystals. 5, Stigma from disk floret. 6, Fibrovascular tissue of stem. 7, Tissue of filament. 8, Anther tissue. 9, Pollen.

Wild anthemis flowers in the whole state show a degree of similarity to those of matricaria and this likeness might possibly cause confusion and errors in labelling. The most apparent characters of these flowers are the size and peculiar odor. They are of the usual composite type with a single circle of white ray florets and the yellow disk florets crowded upon the receptacle. Although the inflorescence is similar, it is about three times larger than that of matricaria. The odor is very penetrating and resembles that of amyl acetate, being very different from the mild and pleasant odors of matricaria and cultivated anthemis.

The botanical points of difference and relationships between cultivated anthemis, wild anthemis and matricaria might be summarized as follows:

	Anthemis cultivated.	Anthemis wild.	Matricaria.
Type of inflorescence	Compound; white ray-flowers in many series	Compound; white ray-flowers in single series	Compound; white ray-flowers in single series
Involucre	Bracts elliptical and pubescent; 2–3 series	Bracts obtuse and pubescent; scarious margins; imbricated in many series	Bracts oblong obtuse (oblanceolate); imbricated in many series
Receptacle	Conical or convex; solid; chaffy	Conical or convex; solid; chaffy at apex	Ovoid-conical; hollow; not chaffy
Ligulate florets	Numerous; in several series; pistillate; 3 toothed, 4 veined	Numerous (12–18) in one series; pistillate; 3 toothed, 3–6 veined	Numerous (10–20) in one series, pistillate; 3 toothed, 4 veined
Disk florets	None or few; perfect	Numerous; perfect	Numerous; perfect
Achene	Oblong; obtusely three-angled; pappus none	Oblong; pappus none	Obovoid; 3–5 ribbed; pappus none or mere membrane

Powdered wild anthemis shows resemblances to both anthemis and matricaria in that the characteristic trichomes of the former and the numerous pollen grains

of the latter are present. At first sight it would appear as if the material consisted of a mixture of both chamomiles. The tissue elements present are those of the involucre, ligulate florets, disk florets and stems.

Involucre.—Fragments of this tissue appear as long, white, polygonal cells without papillate surface. Simple multicellular trichomes with long, terminal cells similar to those commonly found in anthemis are attached to the outer surfaces of the bracts. In powdering, these trichomes become detached and appear free in the field.

Ligulate Florets.—This tissue appears in the form of irregular, white cells bearing prominent papillae and identical with the corresponding tissues of anthemis. Many of the cells contain small rosette crystals. The papillae on the surfaces and margins of the ligulate florets of matricaria are broader than those of anthemis and wild anthemis but are not as prominent.

Disk Florets.—The tissues of the disk florets include a membranous calyx similar in structure to the chaffy bracts. Corolla fragments with attached remnants of both androecium and gynaecium are also present. Referring to the botanical summary it will be noted that the receptacle of wild anthemis is chaffy and the same condition prevails in the cultivated anthemis. Trichomes of a type similar to those described under the involucral tissues, may be attached to portions of these chaffy scales. The corolla fragments are composed of irregular yellow cells which, with the possible exception of the lobes of the tube, are sparingly papillate. The stamen tissues appear as fragments of long, deep yellowish, pitted and striated cells. Pollen grains are fully as numerous as in matricaria and are of the spinose and three-pored type. The stigma and style tissues consist of thick fragments showing small, yellow, rectangular cells with their exposed surfaces covered with papillae. The papillae of the stigmatic surfaces are especially large.

Stem.—The stem tissues include short, thin-walled fibers, spiral vessels and an epidermis showing few stoma but numerous trichomes of two types. One variety of trichome is very similar to those found attached to the bracts but is rather smaller. The second type of trichome is curved, multicellular and with thick-walled terminal cell.

The present revision of the Pharmacopoeia does not include a histological description of matricaria but the details of its microscopical structure will be found in most of the standard reference books on pharmacognosy. Anthemis is similarly described in these texts. By reference to such descriptions it will be apparent that the histologic distinctions betwen wild anthemis, cultivated anthemis and matricaria may be covered in the following brief statements:

Wild Roman anthemis chamomile is most easily distinguished from Roman chamomile (Anthemis, cultivated) by the numerous spinose pollen grains and the abundance of yellow stamen and disk floret tissues.

Wild Roman chamomile may readily be distinguished from the wild, Hungarian or German chamomile (Matricaria, U. S. P.) by the numerous trichomes of the anthemis type.

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DEPARTMENT OF HEALTH,
CITY OF NEW YORK.

THE SEASONAL VARIATION OF ACIDITY, TOXICITY, AND ALKALOIDAL CONTENT OF THREE SPECIES OF LARKSPUR.

BY O. A. BEATH.

GENERAL DESCRIPTION.

The three species of larkspur selected in this investigation represent distinctive altitudes and habitats. The plains type (*Delphinium geyeri*), commonly called low larkspur, grows on the plains of Wyoming and Colorado at altitudes ranging from five to seven thousand feet. It usually appears during May, and under normal conditions of growth, may be found in full bloom the latter part of June. After the flowering stage the plant dries up and rapidly disappears from the range. This species is a dangerous one from the time it appears until the flowers are well developed.

The next species in order of elevation is represented by *Delphinium glaucescens*. This plant grows in the shaded areas of canyons and mountain sides at an altitude of about eight thousand feet. As a general rule this species appears in the early part of June and is in full bloom by the middle of July. On account of its habitat the plant remains fairly green until the seeds are well developed. The losses from this plant are insignificant.

Delphinium subalpinium (*D. barbeyi*), commonly called the "tall larkspur," grows at elevations ranging from nine to thirteen thousand feet. It grows largely in the open, although one may find occasional patches partially shaded. On account of the climatic conditions encountered at higher altitudes, this plant has a variable growing season. *D. subalpinium* is one of the most poisonous of the larkspurs.

ACIDITY.

The expressed juice of the larkspurs is strongly acidic, and if appreciably diluted the concentration increases. Wicke[1] reports the free acid of *D. consolida* to be aconitic acid. His conclusion was based upon the fact that the silver salt had the same chemical composition as silver aconate, therefore, aconitic acid. The native larkspurs yield an acid having the chemical composition of $C_6H_6O_6$, but having physical and chemical properties quite different from those exhibited by the normal acid. It appears to be one of the two possible isomers. The acid obtained from the native larkspurs melts at 166–7° C., is non-toxic and optically inactive. It is very soluble in ether, alcohol and water. The silver salt detonates when heated slightly. The ethyl ester boils under a pressure of 25 mm. at 171–2° C.

In addition to the free acid necessary to form the water-soluble salts (alkaloidal) the plant produces a considerable excess. The acid also enters into chemical combination with a crystalline alkaloid to produce an amorphous complex, the latter being much more potent than any of the crystalline derivatives.

Figure 1 illustrates in a general way the seasonal distribution of the uncombined acid. It is clear that in the early periods of development the relative quantity of acid is quite uniform for the three species. There is no apparent correlation between the seasonal variation of acid and crude alkaloid.

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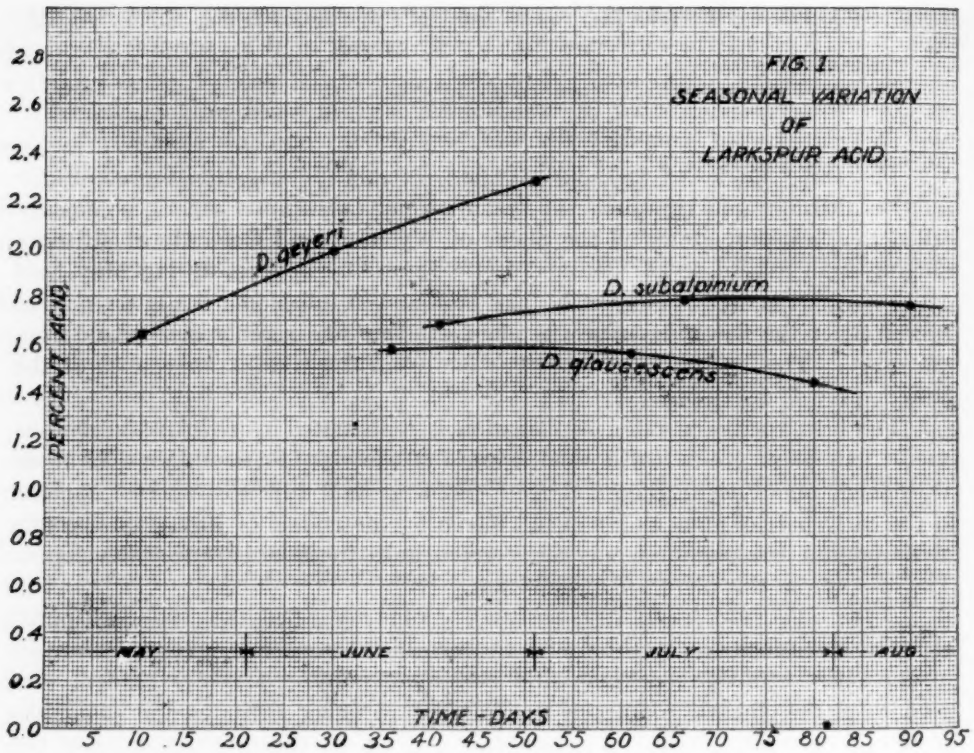
[1] *Annalen der Chemie*, Vol. 90, pp. 98–9.

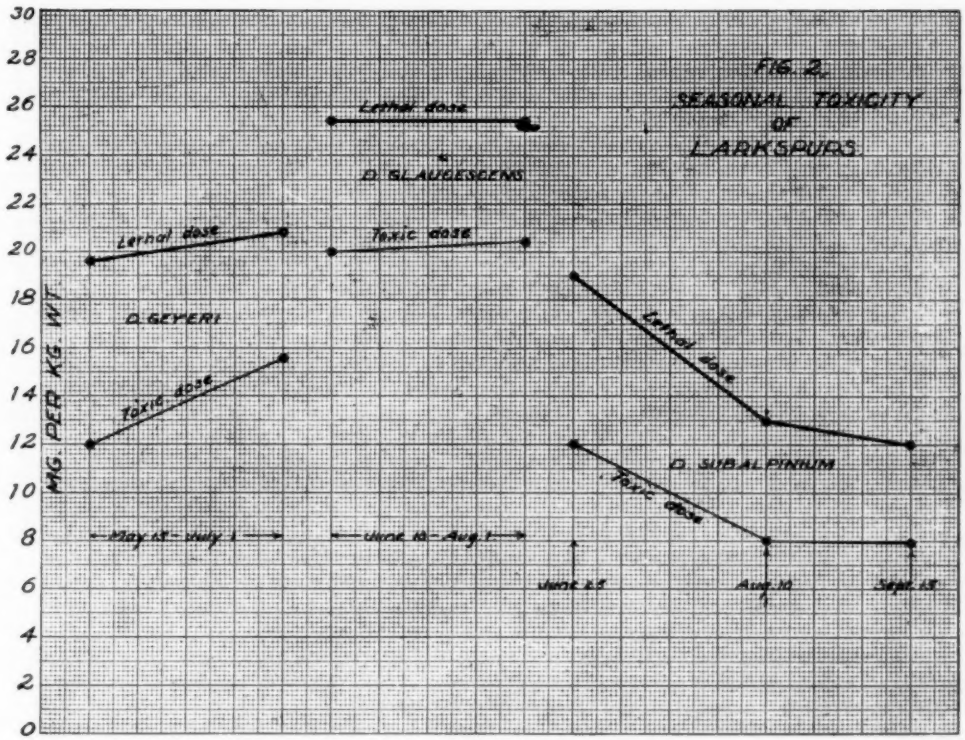


The relation of acid and toxicity will be discussed in another part of this paper.

TOXICITY.

The contributions relative to the seasonal variation of larkspur toxicity have not been consistent. The statement has been made, and seems to be borne out by range observers, that the larkspurs, as a rule, are more poisonous in the early stages of growth. Other contributing factors are involved while the plants are immature and must be carefully considered before final conclusions are drawn.

The experiments were undertaken to determine the period of maximum and minimum potency of the crude larkspur poisons at distinct stages of growth. The plants (whole) were carefully selected, dried, and reduced to a uniform powder. After percolating with alcohol the oils, fats, and resins were extracted with petroleum ether. The crude alkaloidal residues were taken up with seventy per cent alcohol and made up to definite dilutions. The extracts were introduced intravenously into full-grown rabbits. The tests were made in duplicates and the average results tabulated. Figure II illustrates the relative amounts necessary to kill and to produce symptoms. *D. glaucescens* is shown to be much less poisonous than the other two species, although exhibiting no apparent change with the advance in growth. The tall larkspur differs from the other two types in that, as the flowering stage approaches, the lethal dose becomes comparatively small. The crude alkaloid of the seeds has practically the same value as that found in the whole plant (flowering stage).

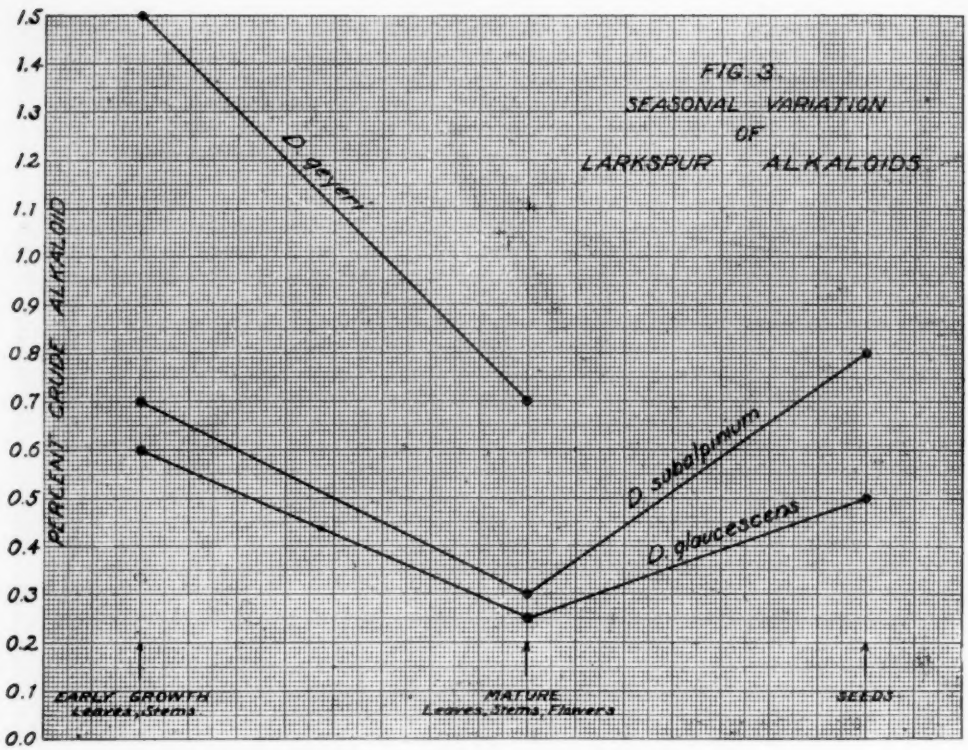


If the statement is correct that the larkspurs are more dangerous during the early periods of growth, clearly the cause is not due to greater toxicity.

D. geyeri and *D. subalpinium* are species representing the extreme conditions of growth, and yet the physical properties of the poisons obtained from them exhibit striking resemblances. *D. glaucescens*, the intermediate type, yields alkaloidal products markedly distinct from those of the other two species. The principal alkaloid is crystalline, optically active, has a structure much more complex than any other larkspur alkaloids and is present (crystalline form) in the plant at all stages of growth. Its physiological action closely resembles the low larkspur.

D. geyeri yields amorphous alkaloidal products only. In the early stages of growth, *D. subalpinium* yields one crystalline alkaloid, but it soon enters into combination with the plant acid to produce an amorphous product. The latter is very stable and requires saponification with alcoholic potash to resolve it into its constituents, acid and crystalline alkaloid. The toxicity of the amorphous complex is much greater than that of the simple base obtained from it. The low larkspur has the same general type of an amorphous alkaloid as found in the tall species. The crystalline alkaloid obtained by saponification is a new compound and differs from the other two bases in its physical and chemical properties. The pure alkaloid is very much less toxic than the amorphous complex from which it is derived.

The acid being non-toxic, it is interesting to observe that its combination with a slightly toxic base produces the intensely poisonous complex encountered in the two species. The alkaloids from *D. glaucescens* occur in the plant as salts. The corresponding amorphous complex is not formed in this plant.



SEASONAL VARIATION OF ALKALOIDS.

The determination of crude alkaloids in the larkspurs is attended with no difficulty if proper care is taken. It is necessary to use a mild alkali in breaking up the alkaloidal salts, otherwise decomposition follows and hence loss. The plant material was carefully selected, air dried, and reduced to a uniform powder. The moisture was determined on an aliquot portion, so that the percent of alkaloid has been computed on a bone-dry basis.

Figure 3 illustrates graphically the seasonal fluctuation. The three types follow the same general course, *D. geyeri* having the highest percent of any of the larkspurs. The seeds of this species were not obtainable. The pods of *D. subalpinium* and *D. glaucescens* contain far less alkaloid than the leaves and stems for the same period. As a rule the lowest alkaloidal content is reached when the plants are in full bloom. From this point on to the seeding stage, the percentage in the leaves and stems decreases somewhat while that in the seeds rapidly increase. An alkaloidal assay made on *D. subalpinium* at the time of seeding gave 0.25 percent of alkaloid in the leaves and stems, 0.20 percent in the pods, and 0.80 percent in the seeds.

The data indicate very clearly that the larkspurs are dangerous plants when immature, largely because of the quantity of alkaloid rather than its increased toxicity.

A Station bulletin is now being prepared giving the details obtained through a comprehensive chemical study of the larkspurs.

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SECTION ON PRACTICAL PHARMACY AND DISPENSING, AMERICAN PHARMACEUTICAL ASSOCIATION.*

ABSTRACT OF THE MINUTES OF THE SESSIONS HELD IN CHICAGO, ILL., AUGUST 14 15 AND 16.

FIRST SESSION.

The first session of the Section on Practical Pharmacy and Dispensing of the Sixty-sixth Annual Convention, A. Ph. A., was called to order by Chairman J. C. Peacock, at 2:00 o'clock P.M., Wednesday, August 14. The Chairman read the following address:

Address of Chairman J. C. Peacock:

TO THE SECTION ON PRACTICAL PHARMACY AND DISPENSING, A. PH. A., CHICAGO MEETING, 1918:

In opening the sessions of the Section on Practical Pharmacy and Dispensing during such stirring times as these it becomes a patriotic duty to our cause to refer to those who, inspired by an earnest devotion to the same sixty-six years ago, came from the various parts of the United States and assembling in Philadelphia, the birthplace of our Nation, laid, as did its founders, the cornerstone of this Association, with a declaration for the right.

These men defined pharmacy to the Nation as a profession entrusted to the dispenser by both physician and community; they insisted that candor only as the true spirit of pharmacy be practiced, and they pledged their efforts to right the wrongs which pharmacy might correct. And there is no finer tribute which we can pay to their appreciation of pharmacy than to remind ourselves that they were in such close contact with the mortar and pestle, and in such immediate fellowship with the public that they saw in pharmacy the personal service to humanity both in the quality of their materials and in the art of dispensing them. They sought to improve both materials and art for the benefit of those they served. As individuals they were each and every one possessed of resource and determination; but they knew that they could learn from one another; they knew the value of united effort, and that through an association the good that each could do would be spread broadcast. And that is why they met. And if we read the deliberations of this first meeting we will be convinced that we have no higher, no more useful purpose to-day; for their object is still our object, and their spirit has always been and must remain the spirit of this Association.

PHARMACY AND THE PUBLIC.

While it is to-day our patriotic duty to pharmacy to refer to these zealous men it is equally incumbent upon us to declare that pharmacy must be further explained for a better comprehension of it by the people of our country, because we are asking our Government to give pharmacy the same consideration in war that it does in peace, for the benefit of the soldier who stakes his life in our defense. Our offer of the service of pharmacy to the soldier is not at all an unusual one, for when attired in the raiment of civil life he has it within easy access, and the Nation, as well as the State, has standardized this service and insists upon it for his and everybody's protection. But when the man is called to arms and takes upon himself the uniform he hopes to glorify; this very safeguard so provided and so insisted upon in civil life is denied him as though then unnecessary. This is neither consistency, justice nor respect for civil law; nor is it efficiency. That there are many pharmacists in the Army is known to all, and even in the face of the fact that they stand trained both as soldiers and pharmacists they are not specially selected to take care of and dispense the medicines needed by their comrades. Indeed, the scantiness with which they are called upon to do so is the result of sheer coincidence, while the neglect to use them for their special adaptation is so grossly apparent as to assume the proportions of a studied avoidance. This condition, fellow-members, makes it necessary to bring pharmacy into the lime-light of public attention, for we need the appreciation of the public to help us help the Nation's warfare by promoting the soldier's welfare. We must therefore advertise

* Papers with discussions thereon will be printed apart from Minutes.

this condition to the public as assiduously as our Nation is advertising its need for money to us in order to make a proper impress of this disregard of civil law which works an injustice on the soldier.

This is why pharmacy needs to be explained and demonstrated in daily practice to the end that the public shall understand it as a service of such serious import as to require legislative regulation, and not merely a word of eight letters appropriated some decades ago by the sign painter to make one drug store look different from another. And this advertising of pharmacy must be persisted in until every voter who has any interest whatsoever in the welfare of a soldier is not only disillusioned regarding any supposed present protection of the latter, but also shall demand that the civil rights of our defenders be not thus annulled.

Having thus devoted our attention to a patriotism demanded by our duty to the soldier and to pharmacy as well, we turn to thoughts pertaining to the progress of pharmacy and to conditions directly affecting the pharmacist.

THE U. S. PHARMACOPOEIA AND NATIONAL FORMULARY.

The best known accomplishment of American pharmacy that is in material form as evidence of its work and progress is the standardized materia medica which it has developed and which is embodied in the United States Pharmacopoeia and the National Formulary.

As our Association has Committees on both and of itself issues the National Formulary, and as these Committees report to this Section, it will not be out of place here to say a few words regarding these two legal standards as the evidence of the progress which pharmacy has made and is now making.

Sixty-six years ago the United States Pharmacopoeia was little more than a catalogue of titles and formulae. To-day it is an encyclopaedic volume, the study of which can not be too strongly recommended to practicing pharmacists; for it will prove a revelation to those who were graduated no less than ten years ago, and will awaken in every one a better idea of what is expected of pharmacists to-day. Nor can less be said of the National Formulary, which really is an "extra" U. S. Pharmacopoeia; and, because it is the work and property of our Association, we should feel both proud and duty bound to know its contents and its value.

THE JOURNAL AND THE YEAR BOOK.

And with the thought still in mind that pharmacy is improved in our trust by endeavoring to keep ourselves abreast of its progress, we want to refer to the JOURNAL of our Association as a potent factor in maintaining interest in pharmacy by recording its progress as a first consideration. This high-class periodical may be depended upon to bring each month a message of the true spirit of pharmacy with which it is inspired. Nor do we intend to pass mention here of the Year Book of our Association; a wonderful condensation of the pharmaceutical literature of the world; verily a volume of the "solid extract" of progress in pharmacy. The study of the JOURNAL and the Year Book will constitute what this Association has been so aptly termed—a post-graduate course in pharmacy. Our Association is fortunate indeed to be so ably represented to its members through the efforts of those who have these various duties in hand, and with unstinted enthusiasm may we display to the public these volumes of the progress of pharmacy as proof of the claims which we make for our art.

THE PRACTICE OF PHARMACY AND CONDUCT OF THE DRUG STORE.

The practice of pharmacy itself deserves a word of notice at our hands. The compounding of prescriptions remains as heretofore the best representative of pharmacy in our stores, for the reason that it is most closely associated with the work of the physician. It is the experience of those who have made the test that personal interest in the profession of pharmacy as attested by the care which is given to this department will produce the greatest assurance of one's ability and dependability through service to the public, and will build a prescription and drug trade among appreciative customers, the merits and stability of which will before long be recognized by physicians themselves, and not only command their respect but secure their encouragement and support.

Our Association has a committee on "Closer Affiliation of Pharmacists and Physicians," which might with advantage render a direct report to this Section, even if it did so in addition to the one intended for the General Session. The work of said committee is clearly related to the matters with which this Section has to do and I would, therefore, recommend that this thought be referred for consideration and action.

The scarcity of help is being severely felt by the pharmacist. Many are taxed to the limit of endurance by the combined effects of the work, care and hours of business. The time is propitious for the pharmacist to show his individuality by remembering that his hours to keep open store need not be influenced entirely by another's actions. An hour or a half hour taken from each end of the day will to that extent, at least, help conserve the health and strength of those in the store, as well as supply the encouragement of shorter hours to all. Indeed, one can not keep from seeing that the condition which confronts us makes for a permanently shorter working day for the drug store, as well as for many another vocation. These trying times will also put the loyalty of many to the test as between interest in pharmacy and side-lines. But though pharmacy may suffer because some give over their attention to side-lines and yet retain the name of pharmacy upon which to trade—a thing to be deplored—pharmacy will on the other hand, profit by such desertions to other interests as pass entirely out of its ranks.

Therefore, must pharmacy find within itself that temperament which will not allow it to be downcast because of such circumstances as have been mentioned?

WOMEN IN PHARMACY.

No sooner had enlistment and draft begun to show a depleting effect upon the labor needed for our large industries than women came forward to fill the places vacated. The advent of women into pharmacy some years back was a matter of much concern to those who have never quite understood that their mothers were women. But the doubts of these had already been dispelled before the present crisis arose to brush aside many a cherished notion as to women's work. Pharmacy in all its branches needs industry, care, neatness and devotion. It therefore offers an opportunity to those who have these requirements. As women can supply all of them, they are destined sooner or later, whether in war or peace, to find their way into pharmacy, and the exacting work of the prescription department will be their goal.

CONSERVATION IN PHARMACY.

Regarding the conservation of alcohol, glycerin and sugar by pharmacists we believe, that in so far as actual pharmacy is concerned, the best interest of the public can be served by pharmacists being allowed a sufficient supply of these materials for all pharmaceutical purposes. These actual needs will be found to be small in comparison with the annoyances, disappointments, and irregularities which must certainly arise if such supply is curtailed. There seems little reason why patient, physician or pharmacist should be exposed to the necessity for any other course. But improvement as a true economy may result from an interchange of views on the subject, therefore, a general discussion pertaining to War Emergency Formulae has been scheduled for one of our sessions in order that the opinions and suggestions of all may have consideration.

THE ANTI-NARCOTIC LAW AND ITS ENFORCEMENT.

More than three years have elapsed since the enforcement of the Harrison Act, a sufficient time in which to observe its operation with regard to its effect on the practice of pharmacy. Few, if any, consider it perfect, but it has been accepted as a satisfactory first step in a worthy effort. It is the opinion of some that its existence will hasten the obsolescence of some of the compound opiates of the National Formulary, more especially those of such strength as require the special form of prescription. Such a result should encourage prescription writing, for if a physician decides upon the use of an opiate he will likely determine the dose and also state his preference as to what is to accompany it. It can scarcely be said that the operation of the Harrison Act has worked any hardship upon the pharmacist that has not been compensated for by an increased sense of appreciation, both by the public and the physician. And although a loose observance on the part of the pharmacist might at times apparently conciliate patient or physician, still, aside from every other consideration, self-respect demands a strict adherence, and confidence accrues only in him who will not intentionally deviate from the conditions imposed. We fail to see where any considerable volume of business of a desirable nature can be lost to the pharmacist either because of the law itself or through his strict adherence to its requirements. Nor can we conceive that any law which seeks to regulate the use of opiates with a view to restricting them to intelligent use will do other than help the practice of pharmacy.

It is unfortunate that we do not specifically have as inspectors under this law individuals who have had pharmaceutical training, that they may feel the spirit of the law, and by thus

appreciating the conditions under which it operates, help pharmacy toward what is possible in its improvement. Inspectors, without such training, may not comprehend the intent and technicalities and thus make of inspection a purely perfunctory service.

J. C. PEACOCK,
Chairman.

On motion of H. P. Hynson the address was referred to a committee of three, empowered to take up for consideration the different subjects touched upon by the Chairman, and submit them at the proper time in connection with other papers, or submit them independently if necessary, in some appropriate place in the program, so that the Chairman's views may be brought to the attention of the Association. Mr. Hynson also made the specific recommendation in support of the Chairman's suggestion that the Association be requested to send the report of the Special Committee on The Relationship of Physicians and Pharmacists to this Section.

The following papers were then read, discussed, and referred for publication:

"A Plea for a Closer Study of our Pharmaceutical Preparations in the Light of Criticism of the Medical Profession," by L. E. Sayre.

"A Proper College of Pharmacy Course that is of Interest to the Commercial Druggist," by Edward Spease.

"Spirit of Peppermint, U. S. P.," by E. F. Kelly.

"Therapeutical Standards, Past and Present," by Edward Kremers.

"Carbon Tetrachloride as a Solvent for Fats," by J. P. Snyder.

"On the Keeping Qualities of Dakin's Solution," by Irwin A. Becker.

"The Practical Pharmacist from the Manufacturer's Standpoint," by R. C. White.

"Note on Tincture of Cinchona Compound," by F. W. Nitardy. The paper was read by the Secretary.

The first session of the Section on Practical Pharmacy was then adjourned.

SECOND SESSION.

The second session of the Section on Practical Pharmacy and Dispensing was called to order by the Chairman at 2:30 P.M., Thursday, August 15.

Mrs. J. M. Kenaston read a paper entitled "The Pharmacist's Objectives." It was referred for publication after discussion.

REPORT OF THE COMMITTEE ON THE CHAIRMAN'S ADDRESS

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

Your Committee is seriously impressed by the most appropriate and comprehensive character of Chairman Peacock's address which shows creditable familiarity with actual conditions in the practice of pharmacy and offers practical and promising suggestions that will, undoubtedly, be helpful to those seeking a reasonable advancement of pharmacy and to those endeavoring to correct current abuses; the address is commended to both classes of reformers for serious study. It is also believed by this Committee that it would be wise for the schools of pharmacy to encourage the study of this and similar discussions by students of pharmacy, that they will be better able to confront conditions they will meet in their coming practice.

Especial attention is called to the Chairman's remarks on a number of pertinent subjects, and the suggestion is made that a careful general discussion of these be had by this section if time can be found for doing so. Such a discussion would probably result in finding a mode of handling the questions that would result happily to all concerned.

The subjects suggested in the Chairman's Address are as follows:

"The higher inspiration for pharmaceutical action."

"A better appreciation of true pharmaceutical practice by the public and, especially, by Government officials and by State and National legislators."

"Coöperation between physicians and pharmacists."

"A fairer understanding by the laity of the creditable work done by pharmacists in the making of our National Standards for medicines."

"Shorter hours and the conservation of help in pharmacy."

"The enforcement of the National Narcotic law and the character of inspectors required."

Respectfully submitted,

HENRY P. HYNSON,
(Signed) CURT P. WIMMER,
L. E. SAYRE.

The report was accepted and the recommendations contained therein were endorsed, and the Secretary was instructed to send a copy of this report to the succeeding officers of the Section.

W. L. Scoville then presented the report of the Committee on National Formulary. This report was referred to the Council. (See Committee Reports.)

The chairmen of the Committees on U. S. Pharmacopoeia and A. Ph. A. Recipe Book were unable to be present, and no reports were submitted.

The following papers were read:

"Pharmaceutical War Babies," by C. P. Wimmer.

"Percentage Solutions," by H. L. Thompson.

"Analysis of Milk of Magnesia," by R. W. Terry.

The Secretary then read a note from Professor J. U. Lloyd, who was unable to remain for this session. It follows:

"TO THE SECTION ON PRACTICAL PHARMACY AND DISPENSING:

My paper on 'Solvents in Pharmacy' continues the subject introduced last year. The newly introduced feature comprises descriptions of the meniscus that forms between separated liquids, the same being portrayed by illustrations.

This paper is not subject to condensation, is too precise concerning details to be read at length before the Section, and is therefore presented by title.

(Signed) JOHN URI LLOYD."

In order to open a discussion on the subject of War Emergency Formulas, a paper by Bertha Mueller, entitled "Notes and Suggestions on the Use of Glycerin in Official Preparations," was read by the Chairman.

A paper entitled "Continuous Percolation under Reduced Pressure," by J. G. Beard, was read by C. M. Snow. The following papers were read by title:

"The Druggist as a Public Notary," by Emil Roller.

"Laboratory Notes," by T. D. McElhenie.

"Some Views on Practical Pharmacy," by E. T. Hahn.

"A Combination Prescription Check, Cash Slip, Charge Slip and Working Record," by C. Osseward.

"Some Pharmaceutical Notes," by W. R. White.

Nominations for officers for the ensuing year were made, after which the second session was adjourned.

THIRD SESSION.

The third session was called to order by Chairman J. C. Peacock at 9 o'clock A.M., Friday, August 16.

The first paper was entitled "The Preparation of Tinctures by the Dilution of Fluidextracts." It was presented by Edward Davy. Then followed a "Prescription Clinic," by Charles H. LaWall. Both the paper and the Clinic elicited much discussion.

The Secretary then read a paper by F. L. Stone, entitled "Can a Retail Druggist Continue as a Manufacturer?" The following papers were then presented by title:

"A Utilization which Conserves," by J. C. Peacock.

"Lime, Lime Water and Lime Water Tablets," by R. W. Terry.

"The Use of Logarithms and Antilogarithms in Pharmaceutical Assaying," by H. L. Thompson.

"The N. F. Petroxolins and Paralle Preparations," by H. A. Langenhan and G. J. Noll.

"Sterilized Distilled Water," by E. F. Cook and L. Gershenfeld.

"An Experiment on Compound Tincture of Benzoin," by J. C. and B. L. DeG. Peacock.

"Absence of Inspection under the Harrison Act," by J. C. Peacock.

This concluded the papers, all of which were referred for publication.* Further nominations were called for, and after balloting on the names of those presented as candidates as associate members on the Committee, the officers for the ensuing year were reported to be as follows:

Chairman, R. W. Terry, Groveport, Ohio.

Secretary, Edward Davy, Columbus, Ohio.

Associate Members, William Gray and Irwin A. Becker, both of Chicago, Ill.

The new officers were installed. The retiring Chairman thanked his colleagues for their help, and the third session was adjourned by the newly-elected Chairman, Robert W. Terry.

CONTINUOUS PERCOLATION UNDER REDUCED PRESSURE—REPORT No. 1.*

BY J. G. BEARD.

This will be a preliminary report on the progress I have made to date on a new (or at least modified) process for percolating fluidextracts.

This process consists essentially of extracting drugs in the preparation of fluidextracts through the use of a specially designed percolater that keeps the drug constantly in contact with fresh menstruum but not new menstruum. It may be thought of as a modified form of Soxhlet extraction.

The apparatus involved consists of four parts: A generator which is a glass distilling flask having an upright side-arm tube to permit introduction of a thermometer and a mercury gauge for measuring pressure; a percolator shaped like the Oldberg form but having a lateral tube opening into the percolator above the top of the drug and also entering below the lower portion of the drug, the object being to allow vapors from the generator to pass around the powder to be extracted and reach the condenser; a double Soxhlet condenser to be used as in reflux operations; and a tube from the top of the condenser leading to a vacuum pump. All of these parts are connected together perpendicularly by means of tightly fitting rubber stoppers.

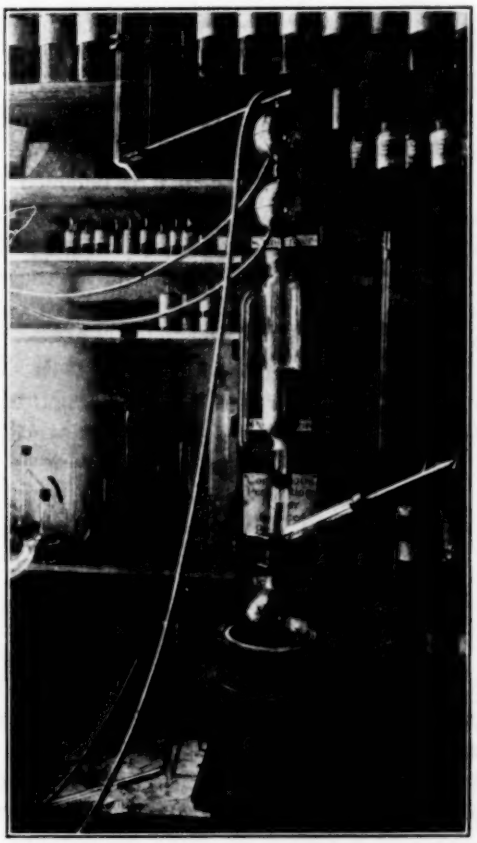
The process is conducted as follows:

The drug from which the fluidextract is to be made is macerated for sixty hours with enough menstruum to render it distinctly and uniformly damp. At the expiration of this time the drug is placed in the percolator, which has been provided with a pledget of cotton, in a succession of layers, moderately packing the drug after the addition of each layer. An amount of menstruum exactly equalling the volume of fluidextract to be made is placed in the generating flask. The parts of the apparatus are then tightly connected together by means of rubber stoppers. Low heat is applied to the generating flask from a constant level water bath, and when the thermometer registers a temperature of approximately 30° C. the vacuum pump is started. The heat and suction are carefully continued until such a pressure and temperature are obtained

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., Chicago meeting, 1918.

in the apparatus as will enable the menstruum to boil between 35–40° C. With the source of heat remaining a constant, the tube leading to the vacuum pump is then tightly closed with a screw pinch-cock to seal the apparatus. The menstruum is rapidly vaporized on account of the reduced pressure and passes upward. When the vapors encounter the neck of the percolator they take the path of least resistance through the side-arm tube and thus pass around and out of contact with the drug. These vapors quickly reach the reflux condenser, are cooled, liquefied, and the condensed cold fluid drops straight down upon the drug where it acts precisely as in ordinary percolation, extracting the soluble principles in passing downward. When the percolate thus formed completes its passage through the drug it drops into the generating flask. The portion constituting the solvent is immediately vaporized again as fresh menstruum, and as such is capable of exercising the same solvent effects as on the first trip through the apparatus. The drug as a consequence is constantly subjected to the action of fresh solvent until finally all soluble matter is extracted and the process is completed.

When the operator believes that this point has been reached, he disconnects the generating flask and tests a small portion of the percolate as it leaves the neck of the percolator with an appropriate reagent, for example in the case of alkaloidal drugs, with Mayer's reagent. If the test is negative nothing further need be done beyond collecting the last drops of percolate and adding to the portion in the flask. If the test shows the presence of active principles the apparatus must be reconnected and the process continued for such time as in the judgment of the operator will have allowed the menstruum to complete the extraction. If the process has been carefully conducted the final volume of fluidextract will equal in mils the number of grammes of drug taken. Whether the finished product will be one hundred percent strong depends altogether upon the strength of the powdered drug taken. In the experiments so far conducted by the author the fluidextracts made by this process have represented in all cases a very close approximation in strength to that of the drug before extraction, and in some cases have tallied to two points to the right of the decimal.



Apparatus for Continuous Percolation under Reduced Pressure

In the case of alkaloidal drugs for which appropriate assays are prescribed by the Pharmacopoeia, the plan of the ninth revision can be followed and the fluidextract tested and brought to standard as well by this process as by the one official.

Up to the time this report was prepared the fluidextracts made were only

from drugs the official menstrua of which contained only alcohol, or alcohol and water. In the case of hydroalcoholic menstrua the water element has never been present in a greater ratio than one to three. There seems no apparent reason, however, why, for example, a glycerin, alcohol and water menstruum might not be used provided the first portion containing the non-volatile glycerin were added *to the drug* as in Type Process B.

A few fluidextracts like that of aconite are debarred from this process, since even the low heat of 35° C. would injure the active principles, but their number is very small. It should be borne in mind that in this process fluidextracts are made, as a result of reduced pressure, at a temperature no higher than normal blood heat.

Sufficient time has not elapsed to determine the keeping qualities of the fluidextracts made by Continuous Percolation under Reduced Pressure. The oldest preparation so made is from nux vomica—eight months old; however, in each case a fluidextract of the same drug was made by the U. S. P. method and reserved as a check. Both kinds of fluidextracts show the same degree of slight precipitation after standing several months.

The advantages which it is believed this process offers are threefold: (1) A saving of menstruum, the only loss being that amount retained by the drug after pressing. (2) Economy of time—after the process is started, the operator's time can be given to other work. (3) If the method be proved as practicable as incomplete experimentation leads one to believe, fluidextracts can be made at less cost than they can be purchased.

The fluidextracts which have been satisfactorily made by the above process are those of nux vomica, hyoscyamus, cannabis, guarana, pilocarpus, podophyllum, buchu, gentian, spigelia, staphisagria.

PHARMACY DEPARTMENT,
UNIVERSITY OF NORTH CAROLINA.

CARBON TETRACHLORIDE AS A SOLVENT FOR FATS.*

BY J. P. SNYDER.

The ninth edition of the pharmacopoeia has in the case of certain drugs which contain considerable quantities of fats and oils directed that these be removed by treating them with purified petroleum benzene. There is a decided improvement in the finished preparations over those of the U. S. P. VIII, which is particularly noticeable in Tincture of Strophanthus and Fluidextract of Colchicum Seed. Formerly, these preparations, when made according to the previous official formula presented a rather unsightly appearance and precipitated badly. The use of a solvent for the fats is evidently the logical method for the removal of these inert substances as our experience has been that it is preferable to attempting to freeze out the fats in the finished preparation.

Petroleum benzene, however, is open to serious objections: Firstly, as it is extremely difficult to drive off completely its peculiar odor which may be easily detected in the finished preparation.

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., Chicago, meeting, 1918.

Secondly, the danger connected with its use: We are all familiar with this liquid and know how highly inflammable it is and while the danger may not be great in treating 100 or 1000 grammes of the drug with this liquid, it often becomes necessary to manufacture 10, 50 or 100 gallons, or more, in which case large quantities of the drug impregnated with this highly inflammable substance must be spread out to dry. While this operation is taking place one cannot rest easily when he realizes that it only requires a spark to start a serious conflagration.

Thirdly, its use is not economical: Owing to its properties previously described, no one would care to take the chance of recovering it by distilling it over a naked flame and while it may be distilled in a steam jacketed pan, the disagreeable odor remains in the pan for a considerable length of time and may contaminate other batches and consequently, if thrown away, it represents a clear loss.

The above shortcomings of petroleum benzene led us to endeavor to find a liquid that would not be open to these objections and which would remove the oily ingredients from the drugs. After considering the list of available substances, we finally decided to try carbon tetrachloride. This liquid readily exhausts completely the fats from such drugs as strophanthus and colchicum seed, while the active therapeutic ingredients are not disturbed, as is shown by subsequent physiological and chemical tests. Upon exposing the drug to the air and sunlight, the carbon tetrachloride may be readily and completely dispelled and there is no odor of this liquid in the finished product. It is absolutely impossible to ignite it, in fact, it is the principal ingredient of several patented fire extinguishers. No danger is connected with distilling it, as we have oftentimes distilled small amounts over a naked flame in our laboratory, as well as treating large quantities in our steam stills without contaminating other batches.

In fact, carbon tetrachloride possesses all the properties of petroleum benzene as far as its use as a solvent is concerned, and it is free from the objections and dangers of the latter.

ANALYTICAL LABORATORIES,
NORWICH PHARMACAL COMPANY.

PHARMACEUTICAL WAR BABIES.*

BY CURT P. WIMMER.

The term "War Baby" has been jocularly applied to the various creations, both abstract and concrete, of the world war. Popularly created nomenclature is invariably significant if not correct, and I use the term here to mean the newer pharmaceutical preparations created by the war. Truly, they are war babies, for only time can tell whether they will live and become useful members of our formularies or whether they will disappear.

It is the object of this paper to present a brief review of a number of the more important pharmaceutical preparations which have come into use during the last few years. All of these preparations, evolved through the exigencies of war, are used to combat sepsis, and to heal wounds or burns.

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., Chicago meeting, 1918.

Inasmuch as infected wounds constitute by far the largest number of cases requiring treatment, it is but natural that physicians from the very beginning of the war sought the ideal antiseptic. The first one to become widely used was iodine. This was supplied to the troops put up in ampuls and millions of them have been used.

English physicians tried out a variety of substances. Sir Rickman Godlee treated wounds with pure carbolic acid, following the treatment with applications of a cyanide dressing. G. Lenthal Chetle used a combination of mercuric chloride and carbolic acid; another physician recommended the use of mercuric chloride and serum. Others advocated the use of such substances as garlic juice, urea, turpentine, liquid paraffin, salicylic acid, etc.

To Sir Almroth Wright must be given credit for suggesting the irrigation of wounds and the insertion of antiseptic tablets into wounds. Then came "Eupad," a mixture of equal parts of bleaching powder and boric acid, and "Eusol," consisting of 12.50 Gm. each of bleaching powder and boric acid mixed with 1 liter of water. From this Dakin proposed his original formula, as follows:

Sodium carbonate, dry, 140.00 Gm. Dissolve this in 10 liters of tap water and add 200 Gm. of chlorinated lime of good quality. This is shaken and set aside; then the liquid is syphoned off and filtered through cotton. Now add 40.0 Gm. boric acid and allow to dissolve. The solution is now ready for use. This solution was to contain about 0.50 percent of hypochlorous acid. Carrell, who used this solution in the irrigation of wounds, soon found that it was of importance to have this solution neither too alkaline nor of a too high hypochlorous acid content and placed it by proper modifications upon an exact basis by requiring titration to determine its strength. The details of the preparation and analysis of the Carrel-Dakin solution have been treated in such exhaustive manner in publications of late that I will not touch upon them here. Suffice it to say that of all the pharmaceutical war babies, this is the one most likely to survive.

A preparation which is now largely used and which is distinctly a creation of the war is the so-called "Bipp Paste," a bismuth subnitrate, iodoform-paraffin combination. Its formula is as follows:

Iodoform.....	8 ounces
Bismuth Subnitrate...	8 ounces
Liquid Paraffin.....	q. s. to make a paste.

After cleansing the wound it is completely filled with this paste and dressed with sterile gauze. It is not necessary to change the dressing unless pain is experienced by the patient. It is of course very important that this paste be absolutely free from gritty material.

It has been found that the crystallized iodoform, reduced to a very fine powder, is less apt to produce iodoformism than the granular form. If iodoformism sets in, potassium bicarbonate is given in 15-grain doses to combat it. A metallic spatula must not be used in the preparation of this paste.

Chloramine T (sodium para-toluene sulphochloramide) and Dichloramine T (toluene parasulphodichloramine) next engage our attention. Of these two antiseptics the latter is more extensively used because of its solubility in eucalyptol, which solution can then be diluted with paraffin oil. The antiseptic action of this substance depends upon the fact that chlorine is slowly given off, which exerts

the specific effect. In making solutions of Dichloramine T it is preferable to use chlorinated oils to prevent or retard the decomposition of the medicinal ingredient. A nasal spray, for example, may be prepared by dissolving Dichloramine T 0.20 Gm. in 2 Cc. of chlorinated eucalyptol and adding 8 Cc. of liquid paraffin. A 10 percent stock solution of Dichloramine T in chlorinated eucalyptol will keep for about one month. Quite recently Dakin and Dunham (B. M. J.) announced that they had discovered a new solvent for dichloramine by chlorinating hard paraffin. This process is, in short, the following: Paraffin melting at 50° C., or higher, is selected and placed into two flasks connected in series. It is heated to 120° C. and a rapid current of Cl gas is passed through until the paraffin is saturated or until the contents of the flasks have increased 45–55 percent in weight. The oily liquid formed is shaken with 5 percent of its weight of sodium carbonate and filtered through a dry fluted paper. This chlorinated paraffin is a clear, viscid liquid of a yellow color and slightly heavier than water. The authors propose to call this liquid Chlorcosane. It is capable of dissolving $8^1/_2$ to 10 percent of Dichloramine T. For wound treatment a $7^1/_2$ percent solution is sufficiently strong. For spraying it may be diluted with 10 percent carbon tetrachloride.

Dichloramine T and its preparations have been fully described in our literature. At the recent meeting of The New Jersey Pharmaceutical Association, Prof. E. Fullerton Cook read an excellent paper on the subject to which I refer those desiring more detailed information.

In the early part of the war there was announced a French proprietary remedy for the treatment of burns. It was called "Ambrine." This remedy proved so successful that it commanded general attention. It was wax-like and when melted and applied to wounds or burns formed an air-tight covering under which the wound healed rapidly. Experiments were made to determine to what particular property or ingredient the remarkable healing qualities of the preparation were due. It was finally found that when hard paraffin was heated to 130° C. by the aid of superheated steam the resulting product has a somewhat lower melting point than the paraffin originally used and that it had properties similar to those of ambrine. It is now universally accepted that ambrine owes its efficacy to the hard paraffin and not to any resin or oil of amber which are claimed to be present. Further investigations showed that it was essential to use a paraffin of suitable melting point and ductility. In the *Journal of the American Medical Association*, 1917, 69, 1525, are outlined the requirements for paraffin for film treatment. The paraffin must be more pliable and ductile than the U. S. P. kind. It must be liquid at 50° C., pliable at or below 28° C. and ductile at or below 31° C. It should readily adhere to the skin but permit of ready detachment from it. From these considerations has resulted the so-called paraffin treatment of wounds, which is, briefly, the following: The burn is first washed with clean water and dried, a layer of melted paraffin is painted on and covered with a layer of cotton; a second coat of paraffin is now applied and the whole covered with wool and a bandage. The dressing must be changed every day.

A number of modifications have been proposed. One is to use liquid paraffin for the first coat on the wound. This tends to make the application practically painless, for it was found that hard melted paraffin applied to a burn occasioned considerable pain. Another modification consists in the addition of

certain substances to the paraffin to enhance its action. Sollman recommends the addition of 1/2 percent of asphalt, or of 10 percent of cacao butter or yellow vaseline, together with antiseptics such as resorcin and eucalyptol. Hull, in the *British Medical Journal*, Dec. 15, '17, claims that it is best to use an antiseptic before applying the paraffin film. He recommends the use of Acriflavine, as a 1: 1000 solution. The use of aniline dyes as antiseptics has increased of late, and their value as such is under investigation. We owe the suggestion that aniline dyes may be valuable antiseptics to Ehrlich, the inventor of Salvarsan. Flavine, or diamino-methyl-acridinium chloride, was originally prepared by Benda, a co-worker of Ehrlich. Browning and Gilmore called the attention of the profession to the powerful antiseptic action of this substance. The following dyes are in use as antiseptics: Brilliant green, Flavine, Acriflavine, Proflavine, Scarlet-Red. The question as to the real effectiveness of these dyes is still an open one. Extensive biological experiments are now in progress at the Middlesex Hospital, London, to determine their true value. From results announced it appears that Brilliant Green is about 3–4 times stronger than mercuric chloride, and that it is capable of killing organisms in as high a dilution as 1: 30,000. Some of the formulas suggested by Lieutenant Colonel Hull are as follows:

No. 10 Red.		No. 12.	
Scarlet-Red	0.20%	Brilliant Green	0.05%
Oil of Eucalyptus	2.00%	Oil of Eucalyptus	2.00%
Olive Oil	5.00%	Olive Oil	5.00%
Hydrous Woolfat	4.00%	Hydrous Woolfat	4.00%
Paraffin, soft	21.00%	Paraffin, soft	21.00%
Paraffin, hard	67.80%	Paraffin, hard	67.95%
No. 13 Flavine Wax.		**No. 14.**	
Flavine	0.20%	Dichloramine T	0.20%
Oil of Eucalyptus	2.00%	Oil of Eucalyptus	2.00%
Olive Oil	5.00%	Olive Oil	5.00%
Hydrous Woolfat	4.00%	Paraffin, soft	25.00%
Paraffin, soft	21.00%	Paraffin, hard	67.80%
Paraffin, hard	67.80%		

The dye is rubbed with the hydrous woolfat until thoroughly mixed, using about 1/2 ounce of water to assist the solution of the dye. Melt the hard paraffin, add the liquid paraffin and the olive oil. When the temperature of the mixture is at 50° C., add the lanolin-dye paste, stirring until thoroughly mixed. Lastly add the oil of eucalyptus and stir until cold.

We have reviewed, briefly, Dakin Solution, Bipp Paste, Dichloramine, Ambrine-like preparations, aniline dyes as antiseptics. All have come into extensive use during the war. Let us hope that at least some of them will prove to be of inestimable value to man. Let us also call attention to the fact that much research work remains still to be done on these preparations, especially along pharmaceutical lines. Physicians and chemists have taken the lead in creating and applying these new substances. Will the pharmacist rise to the occasion and endeavor to present them to the medical profession in the form of new and elegant and compatible pharmaceuticals? It is my hope and expectation that he will do so!

A REPORT ON DAKIN'S SOLUTION.*

BY IRWIN A. BECKER.

It was the original intention to save a portion of a number of 10-liter lots of Dakin's solution, Daufresne formula, so as to represent, fairly, a period of six months; then to determine to what extent deterioration had taken place.

The results here presented cover a longer period on these same samples, and include several forms of hypochlorite solution for comparison.

Dakin's solution, after the boric acid formula, in 10-liter quantities, was first made by me in August, 1916, following directions carefully, and again in November, 1916.

These solutions were not assayed at the time of making, nor during their using, but samples of the last portions of each were set aside in well-filled, corked, 8-oz. bottles, in a dark cupboard of uniform medium temperature.

The same storing conditions obtained for all samples reported.

Being advised that it was intended to use Dakin's Solution freely, and that it should be made after the Daufresne technique, 10-liter lots were made every 8 to 14 days.

The chlorinated lime was assayed each time before using, and the quantities calculated on the basis of the assay. Ordinary crystal sodium carbonate was used instead of the anhydrous, in the proportion of 2.7 to 1, this factor being calculated from the molecular weights of these salts, respectively.

The chlorinated lime assay was made by a modified form of the method illustrated in Coblentz's Volumetric Analysis, First Edition, page 137–138, under "Chlorinated Lime."

The modifications consisting of using two mils glacial acetic acid instead of hydrochloric acid, and macerating the lime at least two hours, if possible, in a closely stoppered flask, then straining through cotton, the number of mils N/10 thiosulphate consumed equalling the number of percents of available chlorine.

The finished product was assayed in each case and the assay recorded in mils of N/10 thiosulphate V. S. At first, the assays of the finished product were stated in terms of available chlorine, but all have been converted into terms of sodium hypochlorite. All assays were made with the same apparatus, such as burettes, graduates, flasks, etc.

One hundred mils Dakin's Solution containing from 0.45 Gm. to 0.50 Gm. hypochlorite require from 120.8 to 134.3 mils N/10 sodium thiosulphate V. S.; 10 mils require from 12.08 to 13.43 mils volumetric thiosulphate. For convenience 10 mils were taken for assay excepting in one instance, when 5 mils only were used, and of the concentrated solutions 1 mil was used and the result multiplied by 10 to compare with Dakin's Solution.

The details of the assays on the various samples and remarks on modifying conditions are set forth in the following table:

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., Chicago meeting, 1918.

Sample, and date of manufacture.	Date of, and original assay.	Assay 7/5/17.	Loss percent.	Assay 7/18.	Loss percent from original.	Remarks.
A[1].....	...	...	..	0.444	..	Boric acid formula, slightly alkaline to phenolphthalein.
A[2]..... 11/16	0.706 1/5/17	0.614	13%	0.433	39%	Boric acid formula, cork good, bleached.
A[3]..... 11/16	0.54 1/5/17	...	..	0.349	36.4%	Boric acid formula, diluted to be about 0.5%, amber g. s. b.
B..... 1/5/17	0.515 1/5/17	0.49	5%	0.405	21.4%	Dakin's, cork good, bleached.
C..... 3/12/17	0.506 3/12/17	0.428	15.4%	0.273	46.0%	Dakin's, cork porous and decidedly bleached.
D..... 3/22/17	0.513 3/22/17	0.465	9.4%	0.322	37.0%	Dakin's, cork very poor, bleached.
E..... 6/25/17	0.462 6/25/17	0.462	0.0%	(Sample lost)		Dakin's, 10 days, hot weather. No loss.
F..... 7/5/17	...	0.53	(Sample lost)		..	Dakin's, fresh lot.
G[1]..... (Rec'd 3/16)	...	...	..	0.348×10	55%	Commercial brand, assay as per label, 7.7% NaOCl.
G[2]..... (Rec'd 7/18)	...	...	..	0.500×10		Commercial brand, received a few days before assaying, assay as per label, 4.05% NaOCl.

Ordinary care only was exercised with stoppers, as some corks were better than others. It will be seen from the table that where the sample was well stoppered it did not fall below the lower limit of variation permissible, in six months.

The commercial, so-called stabilized, product lost strength, apparently, at about the same rate as Dakin's Solution, Daufresne formula.

THE USE OF LOGARITHMS AND ANTILOGARITHMS IN PHARMACEUTICAL ASSAYING.*

BY H. L. THOMPSON.

It has been my experience in teaching the subject of pharmaceutical assaying that one of the most difficult, tedious and nerve-racking parts of it is the performance of the mathematical calculations involved. As a result, I have attempted to instruct my students in the use of logarithms and antilogarithms, and after six years of such performance, there have resulted the following facts:

1st. As far as accuracy, the results obtained by using logarithms and antilogarithms is 0.01%, and that is considerably beyond the average accuracy in practice.

2nd. The time and labor saved by the use of logarithms and antilogarithms is about one-tenth or less than that used by the method of ratio and proportion, and the multiplication and long division of three or four decimal figures out to the third or fourth decimal place as required in determining strengths of drugs, chemicals and their preparations.

* Contributed to Section on Practical Pharmacy and Dispensing, A. Ph. A., Chicago meeting, 1918.

3rd. The continual use of logarithms and antilogarithms has brought forth five general formulas, two for standardizing volumetric solutions, two for volumetric assay, and one for gravimetric and electrolytic assay.

Just what are logarithms and antilogarithms can not be explained in a better way than to first define a logarithm and an antilogarithm, show a logarithm table and an antilogarithm table, and then explain their use.

(If one is fully acquainted with the use of logarithms and antilogarithms, the following paragraphs may be omitted, and the use of the general standardization formulas and general assay formulas may be considered. See paragraph, Explanation of terms used in the formulas.)

LOGARITHM OF A NUMBER.

Let "a" be a certain fixed number, "n" any other number, and let "x" represent the exponent of "a" required to produce "n." Then "x" is the logarithm of "n" to the base "a."

As equations: if $a^x = n$; then $x = \log_a n$.

Hereafter are given some very simple tables of logarithms.

No.	Logarithm Base = 2.	n.	$\log_{10} n$.	n.	$\log_{10} n$.
1/16	—4	0.0001	= —4	1	0.0000
1/8	—3	0.001	—3	2	0.3010
1/4	—2	0.01	—2	3	0.4771
1/2	—1	0.1	—1	4	0.6021
1	0	1.0	0	5	0.6990
2	1	10.0	1	6	0.7782
4	2	100.0	2	7	0.8451
8	3	1000.0	3	8	0.9031
16	4	10000.0	4	9	0.9542

LAWS OF OPERATIONS WITH LOGARITHMS.

Since a logarithm is an exponent, the laws of operation for logarithms are the same as those for exponents.

Let "x" be the logarithm of "m," "y" that of "n," the base being "a."

Then $\log_a m = x$; or $a^x = m$;

$\log_a n = y$; or $a^y = n$.

Hence $mn = a^{x+y}$ and $m/n = a^{x-y}$;

or $\log_a mn = x + y = \log_a m + \log_a n$;

and $\log_a m/n = x - y = \log_a m - \log_a n$.

We have therefore the rules:

I. The logarithm of a product equals the sum of the logarithm of the factors.

II. The logarithm of a fraction equals the logarithm of the numerator minus the logarithm of the denominator.

Also, if as before,

$\log_a m = x$, so that $m = a^x$;

then, if p and q be any real numbers,

$m^p = a^{px}$ and $q/m = a^{x/q}$.

Hence $\log_a m^p = px = p \log_a m$;

and $\log_a m = x/q = 1/q \log_a m$.

There are therefore two additional rules:

III. The logarithm of any power of a number equals the exponent of the power times the logarithm of the number.

IV. The logarithm of any root of number equals the logarithms of the number divided by the index of the root.

(Rule III contains Rule IV, since the power in question may be fractional.)

The following facts regarding logarithms should also be carefully noted:

(*a*) In any system the logarithm of the base is 1; for $a^1 = a$. Therefore $\log_a a = 1$.

(*b*) In any system the logarithm of 1 is 0; for $a^0 = 1$. Therefore $\log_a 1 = 0$.

(*c*) In any system whose base is greater than unity, the logarithm of 0 is $-\infty$. For if $a^x = m$, and $a > 1$, then if x is a large negative number m will be small. As x increases indefinitely, always being n negative, m approaches zero. That is, $a^{-\infty} = 0$; if $a > 1$. Therefore $\log 0 = -\infty$.

(*d*) A negative number has no (real) logarithm, the base being positive.

(*e*) As a number varies from 0 to $+\infty$, its logarithm varies from $-\infty$ to $+\infty$, the base being greater than 1.

When the number is greater than 1, its logarithm is positive, and when the number is less than 1, its logarithm is negative.

A photo of Logarithms of Numbers and Antilogarithms accompanies this article.

EXPLANATION OF THE TABLES AND THEIR USE.

Logarithms of Numbers.—This table gives the decimal part, or mantissa, of the logarithms of every positive number containing not more than three significant figures. The mantissas of the logarithms of numbers containing more than three significant figures are to be obtained by interpolation or the use of the proportional parts. The integral part, or characteristics, of the logarithm must be supplied by the computer, according to the position of the decimal point in the number.

RULES FOR CHARACTERISTICS.

(*a*) When a number has "n" significant figures to the left of the decimal point, the characteristic of its logarithm is n — 1.

(*b*) When the number is a decimal with "n" ciphers between the decimal point and the first digit which is not zero, the characteristic of its logarithm is 9 — n, and —10 must be supplied to complete the logarithm.

The reason for these rules will become evident when we consider an example.

Find log 631. In the table find 63 in the left hand column and run across the page horizontally to the column headed one. There we find that the mantissa of log 631 = 0.8000.

Now 631 lies between 100 and 1000, *i. e.*, between 10^2 and 10^3.

Hence, by definition of a logarithm, log 631 must lie between 2 and 3.

Therefore the characteristic is 2, and log 631 = 2.8000.

This, of course, is not the exact logarithm of 631, but only its value to four decimal places.

Writing the last equation in exponential form, we have

$$631 = 10^{2.8000}.$$

Multiplying both sides by 10, $6310 = 10 \times 10^{2.8000} = 10^{3.8000}$

Hence, log 6310 = 3.8000.

Multiplying again by 10, $63100 = 10 \times 10^{3.8000} = 10^{4.8000}$. Hence log 63100 = 4.8000. Therefore, where a number is multiplied by 10, the characteristic of its logarithm is increased by 1; the mantissa remains unchanged.

Dividing the above equations successively by 10, we obtain

$$\begin{aligned}
63.1 &= 10^{2.8000} + 10 = 10^{1.8000} \\
6.31 &= 10^{1.8000} + 10 = 10^{0.8000} \\
0.631 &= 10^{0.8000} + 10 = 10^{0.8000-1} \\
0.0631 &= 10^{0.8000-1} + 10 = 10^{0.8000-2} \\
0.00631 &= 10^{0.8000-2} + 10 = 10^{0.8000-3} \text{ and so on.}
\end{aligned}$$

As logarithmic equations these are:

$$\begin{aligned}
\log\ 63.1 &= 1.8000 \\
6.31 &= 0.8000 \\
0.631 &= 0.8000 - 1 = 9.8000 - 10 \\
0.0631 &= 0.8000 - 2 = 8.8000 - 10 \\
0.00631 &= 0.8000 - 3 = 7.8000 - 10, \text{ and so on.}
\end{aligned}$$

The second form of the lst three equations is used for convenience in computations; it is in accordance with Rule *b*.

LOGARITHMS OF NUMBERS

Natural numbers	0	1	2	3	4	5	6	7	8	9	Proportional Parts 1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	8	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7

LOGARITHMS OF NUMBERS

Natural numbers	0	1	2	3	4	5	6	7	8	9	Proportional Parts 1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	6	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	5	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	3	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	3	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	3	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	3	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	3	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	3	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	4	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9026	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	4	4

Logarithms	0	1	2	3	4	5	6	7	8	9	Proportional Parts 1	2	3	4	5	6	7	8	9
.00	1000	1002	1004	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	0	1	1	1	1	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	3	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	1	2	2	3	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	3	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
.20	1585	1589	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	2	2	2	3	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	4
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	2	2	2	3	3	4
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	2	2	2	3	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	2	2	3	3	3	4
.25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	2	2	3	3	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	4	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	4	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	3	3	4	4	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	3	3	4	4	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	3	3	4	4	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	3	3	4	4	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	3	3	4	4	5
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	4	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	4	4	5	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	6	6
.48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	4	4	5	6	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	4	4	5	6	6

Logarithms	0	1	2	3	4	5	6	7	8	9	Proportional Parts 1	2	3	4	5	6	7	8	9
.50	3162	3170	3177	3184	3192	3199	3206	3214	3222	3228	1	1	2	3	4	4	5	6	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	5	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	4	5	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	4	5	6	7	8
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	4	5	6	7	8
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	4	5	6	7	8
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	8	9
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	5	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
.72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12
.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
.77

To discuss Rules *a* and *b* more generally, let "m" be any number. Then by the definition of a logarithm, when

	m lies between	log m lies between
(1)	1 and 10	0 and 1
(2)	10 and 100	1 and 2
(3)	100 and 1000	2 and 3
(4)	1000 and 10000	3 and 4, and so on.

Therefore, when "m" has

(1) 1 digit to the left of the decimal point, log m = 0 + ...;
(2) 2 digits to the left of the decimal point, log m = 1 + ...;
(3) 3 digits to the left of the decimal point, log m = 2 + ...;
(4) 4 digits to the left of the decimal point, log m = 3 + ...; and so on.

Hence Rule *a*.

In the case of decimal numbers,

	when m lies between	log m lies between
(1)	1.0 and 0.1	0 and —1
(2)	0.1 and 0.01	—1 and —2
(3)	0.01 and 0.001	—2 and —3
(4)	0.001 and 0.0001	—3 and —4 and so on.

That is, when "m" is a decimal number in which

(1) no cipher follows the decimal point, log m = 9 ± ... — 10;
(2) 1 cipher follows the decimal point, log m = 8 + ... — 10;
(3) 2 ciphers follow the decimal point, log m = 7 + ... — 10;
(4) 3 ciphers follow the decimal point, log m = 6 + ... — 10; and so on.

Hence Rule *b*.

INTERPOLATION.

Interpolation is the process of calculating numbers intermediate between those given in a table.

Find log 3784.

From the table, mantissa of log of 379 = 0.5786
From the table, mantissa of log of 378 = 0.5775
0.0011 = difference.

Assuming that the increase in the logarithm is proportional to increase in the number, we have

mantissa of log 3784 = 0.5775 + 0.4 × 0.0011 = 0.5779.

The result here given to the nearest unit in the fourth decimal place 0.4 × 0.0011 being taken equal to 0.0004 in place of 0.00044.

PROPORTIONAL PARTS.

For convenience in interpolation, the tabular differences are subdivided into tenths and tabulated under the heading Proportional Parts. In the table given, it is the average of the differences given for the mantissas in one row across the page.

For the fourth figure, add the proportional part given under its column opposite the row of the first two significant figures to the mantissa of the first three significant figures. Thus:

1. Log 543.2 = ?

mantissa of log 543	= 0.7348
prop. part for 0.2	= 2
Log 543.2	= 2.7350

2. Log $(251.9)^{\frac{2}{3}}$ = ?

mantissa of log 251	= 0.3997
prop. part for 0.9	= 15
log 251.9	= 2.4012
	2
	3)4.8024
	1.6008

Since $\log (251.9)^{2/3} = 2/3 \log 251.9$,
therefore, $\log (251.9)^{2/3} = 1.6008$,
or solving $(251.9)^{2/3} = 3.988+$.

3. Log of 0.07127 = ?

mantissa of log 712	= 0.8525
prop. part for 7	= 4
log 0.07127	= 8.8529 — 10

4. Log of $\sqrt[3]{(0.08163)^4}$ = ?

$\sqrt[3]{(0.08163)} = (0.08163)^{4/3} = 4/3 \log (0.08163)$

mantissa of 816 =	= 0.9117
Prop. part of 3	= 2
Log 0.08163	= 8.9119 — 10

$4(8.9119 — 10) = 35.6456 — 40 = 25.6456 — 30$
$1/3(25.6456 — 30) = 8.5489 — 10.$

NOTE.—When a logarithm which is followed by —10 is to be divided by a number, add and subtract a multiple of ten so that the quotient will come out in a form followed by —10.

Thus: $1/4 (8.244 — 10) = 1/4(38.2448 — 40) = 9.5612 — 10.$

ANTILOGARITHMS.

The number whose logarithm is "x" is called the antilogarithm of "x." Thus, if x = log m, then m = antilog x.

Given a logarithm, to obtain the corresponding number (antilogarithm).

1. Log m = 0.4806. m = ?

Find the first three figures in the mantissa in the antilog table similar to logarithm table only remember that zero in the mantissa before the other figures must be considered, and then add the proportional part of the fourth figure of the mantissa.

In the table of antilogarithms, find 0.48 in the left hand column and run across the page horizontally to the column headed 0. There we find that antilog of 0.480 = 3020. Add to this the proportional part under 6, which is 4. This makes the four figures 3024.

Now the characteristic tells how to place the decimal point counting from the left of the four figures, point off

1 place to the right for the characteristic 0
2 places to the right for the characteristic 1
3 places to the right for the characteristic 2
4 places to the right for the characteristic 3

If the characteristic is 9 — . . . — 10 place decimal in front of figures.
If the characteristic is 8 — . . . — 10 place decimal 1 place to the left.
If the characteristic is 7 — . . . — 10 place decimal 2 places to left.
If the characteristic is 6 — . . . — 10 place decimal 3 places to left.

2. Log m = 7.0959 — 10. m = ?

antilog 0.095	= 1245
prop. part 0	= 3
antilog 7.0959 — 10	= 0.001248

Sometimes there is a deficiency or excess of 1 in the fourth decimal, but in all pharmaceutical and chemical assaying, weighing, measuring, etc., if an accuracy of 0.1% is desired, the 4 place table will suffice, but if greater accuracy is desired the 5, 6 or the 10 place logarithms are needed. But for the most part 4 place decimal work is regarded good scientific work.

EXPLANATION OF TERMS USED IN FORMULAS.

I use the terms N/1, N/2, N/10 and N/50 as titles, and if the solution say N/2 H_2SO_4 is absolutely accurate and exact, I write it N/2 H_2SO_4 1.000, and if

otherwise, then N/2 H_2SO_4 0.99, or N/2 H_2SO_4 1.111 as the case may be. This is the C. F. or correction factor.

C. F. means the correction factor of a standard volumetric solution or the percent, upon the given normality. There is considerable difficulty experienced in obtaining absolutely accurate volumetric solutions, because of the influence of changes in temperature, humidity and pressure upon them, and the keeping qualities of these solutions. I have adopted the method of standardizing volumetric solutions just at the time of use, when running some pharmaceutical and chemical analyses, and the factor I determine I call the correction factor of the empirical solution, I am using, upon the given normality of that solution.

R. F. equals ratio factor, a ratio merely between two chosen solutions, regardless of whether they are absolutely standard or not, and the factor is always determined at the time of use.

E. F. equivalent factor, which depends entirely upon the normality of the standard volumetric solution chosen, and assumes that the normality chosen is 100% or has the C. F. of 1.000.

N/a and N/b are algebraic expressions, the a and the b must be given their proper values, and the C. F. of N/a, and E. F. of N/a, their proper values, so that the working of the formulas is possible. Where one formula leads on to the next, it is more convenient to carry over the logarithm of the numbers used, than to find the antilog.

These things will be brought out more clearly by example. (See Example, close of paper.)

There are two formulas for standardizing volumetric solutions:

Formula I.—General Standardization Formula—Solid.

Log Gm. of Standard — log E. F. of Standard for N/a sol. — log mils N/a sol. used = Log C. F. N/a sol. Find antilog.

This formula is used for determining the correction factor of a volumetric solution upon its normality, when standardized against a weighed amount of standard, which is a solid, as N/2NaOH against $KHC_4H_4O_6$; N/2 H_2SO_4 against Na_2CO_3; N/10 HCl as AgCl; and N/10 H_2SO_4 as $BaSO_4$, etc. Here the N/a sol. means N/2 or N/10 as the case may be. The E. F. of N/a means E. F. for N/2 or N/10 sol. C. F. 1.000, and this is given by the fundamental law underlying volumetric chemical analysis that all substances always combine in the same proportion by weight.

Insert the proper values for Gm. of standard, for mils N/a sol., for E. F. of N/a sol., and apply Formula I; the result is the desired C. F. of the N/a sol.

Formula IIa.—(a = b).

Log mils N/a sol. + log C. F. N/a sol. — log mils N/b sol. = log. C. F. of N/b sol. Find antilog.

Formula IIa'.—(a = b).

Log mils N/*a* sol. — log mils N/b sol. = log. R. F. N/a sol. against N/a sol. Find antilog.

Formula IIa".—(a = b).

Log R. F. N/b sol. + log C. F. N/a sol. = log C. F. N/b sol. Find antilog.

Formula IIb.—(a > b) × 5.

Log mils N/a sol. + log C. F. N/a sol. + log c — log mils N/b sol. = log C. F. N/b sol. Find antilog.

Formula IIb'.—(a — b).

Log mils N/a sol. — log mils N/b sol. = log R. F. N/b sol. in terms of N/a sol. Find antilog.

Log mils N/a sol. + log c — log mils N/b sol = log R. F. N/b sol. in terms of N/b sol. Find antilog.

Formula IIb".—(a > b).

Log R. F. N/b sol. + log c + log C. F. N/a sol. = log C. F. N/b sol. Find antilog.

Log R. F. N/b sol. as N/b + log C. F. N/a sol. = log C. F. of N/b sol. Find antilog.

Formula IIc.—(a < b).

Log mils N/a sol. + log C. F. N/a sol. — log C — log mils N/b sol. = log C. F. N/b sol. Find antilog.

Formula IIc'.—(a > b).

Log mils N/a sol. — log mils N/b sol. = log R. F. N/b sol. as N/a. Find antilog.

Log mils N/a sol. — log mils N/b sol. — log c = log R. F. N/b sol. as N/b. Find antilog.

Formula IIc".—(a > b).

Log R. F. N/b sol. as N/a — log c + log C. F. N/a sol. = log C. F. N/b sol. Find antilog.

Log R. F. N/b sol. as N/b + log C. F. N/a sol. = log C. F. N/b sol. Find antilog.

In the above formulas the Formula II*a* is the most general, and the others modifications of it to meet the different cases.

The one volumetric solution here is standardized against another, the latter having a known correction factor from Formula I, then after properly placing the data, and applying Formula II, the result gives C. F. of the N/a sol. The several forms of Formula II cover changes in normality as N/2 to N/10, N/10 to N/50, and *vice versa*, where blank tests are run, and where one solution depends upon another standard solution for its correction factor at the time of use.

Formula IIIa.—General Assay Formula Direct Titration.

Log mils *N*/a sol. + log C. F. N/a sol. + log E. F. N/a sol. + log 100 — log. wt. substance taken = log % w/w. Find antilog.

% w/w = absolute percentage, or percent by weight.

Formula IIIb.

Log mils N/a sol. + log C. F. N/a sol. + log E. F. N/a sol. + log 100 — log vol. substance taken = log % w/v. Find antilog.

% w/v = percentage concentration, or percent weight to volume.

The foregoing Formula III applies to all direct titrations, and is also used after Formula IV in residual titrations for all crude drugs, chemicals and their preparations which are assayed volumetrically. The two forms cover the cases of desired % w/w or % w/v. Placing the values properly will give the desired results.

Formula IV and its several modifications apply to residual titrations, where volumetric solutions of like or unlike normality are used, and after determining the difference, further calculations are carried out then by use of Formula III*a* or III*b*.

Formula IVa.—(a = b).

Log mils N/a sol. + log C. F. N/a sol. = log mils N/a sol. C. F. 1.000. Find antilog.

Log mils N/b sol. + log C. F. N/b sol. = log mils N/b sol. C. F. 1.000. Find antilog.

Subtract the antilogs, and the result equals mils used by substance. Then apply Formula III*a* or III*b* as required.

Formula IVb.—(a > b).

Log mils N/a sol. + log C. F. N/a sol. + log c = log mils N/b sol. used in excess. Find antilog.

Log mils N/a sol. + log C. F. N/b sol. = log mils N/b sol. used in residual titration. Find antilog.

Subtract the antilogs and the result equals the mils used by the substance. Then apply Formula III*a* or III*b*, as required.

Formula IVb' from IVb.—(a > b).

Log mils N/b sol. C. F. 1.000 — log c = log mils N/a sol. C. F. 1.000. Find antilog. Then apply III*a* or III*b* as required, using N/a E. F.

Formula IVc.—(a < b).

This is the same as IV*b*, only values of a and b are *vice versa*, therefore changes signs + to —, and — to +. Then apply Formula III*a* or III*b*.

There is one formula for gravimetric and electrolytic analyses. I have used this because the U. S. P. states how much of any substance should be present as such and such a weight, and so these formulas will give the percentage if the values are properly placed.

Formula Va.

Let m = wt. of sub. obtained, and w = wt. of sub. taken, then log m + log 100 — log w = log % w/w.

Formula Vb.

Log m + log 100 — log V = log % w/v. c = vol. taken.

It will be noticed that I introduced log of 100 or 2.000 into Formulas III and V. This is done to make the % be expressed with its sign. If one desires that it is expressed as a decimal fraction, omit the log of 100. I have found the latter method too confusing, and so I have retained log 100 and after the figures place the % sign.

1. In order to use any empirical solution, I have tabulated for class and laboratory use the volumetric solutions of the U. S. P. and after them their abbreviations, and the formulas to be applied.

It has been my experience that N/2, N/10 and N/50 solutions will suffice for nearly all the volumetric analyses, and therefore I have only listed those.

Tenth Normal Barium Hydroxide, N/10 $Ba(OH)_2$
- IIa against N/10 HCl
- IIb against N/2 HCl

Tenth Normal Bromine, N/10 Br
- IIa against N/10 $Na_2S_2O_3$ — 5

Half Normal Hydrochloric Acid, N/2 HCl
- I against Na_2CO_3
- I as AgCl
- IIa against N/2 KOH or N/2 NaOH
- IIc against N/10 KOH or N/10 NaOH

Tenth Normal Hydrochloric Acid, N/10 HCl
- I against Na_2CO_3
- I as AgCl
- IIa against N/10 KOH or N/10 NaOH
- IIb against N/2 KOH or N/1 NaOH
- IIc against N/50 KOH or N/50 NaOH

Tenth Normal Iodine, N/10 I
- IIa against N/10 $Na_2S_2O_3$

Tenth Normal Oxalic Acid, N/10 $H_2C_2O_4.2H_2O$
- IIa against N/10 $K_2Cr_2O_7$ or N/10 $Na_2Cr_2O_7$

Tenth Normal Potassium Dichromate or Sodium Dichromate, N/10 $K_2Cr_2O_7$
N/10 $Na_2Cr_2O_7$
- I against pure iron, Fe
- IIb against N/10 KOH or N/10 NaOH. (c = 3)
- IIa against N/10 $Na_2S_2O_3$

Half Normal Potassium Hydroxide, N/2 KOH
- I against $KHC_4H_4O_6$
- IIa against N/2 HCl or N/2 H_2SO_4
- IIc against N/10 HCl or N/10 H_2SO_4

Tenth Normal Potassium Hydroxide, N/10 KOH
- I against $KHC_4H_4O_6$
- IIa against N/10 HCl or N/10 H_2SO_4
- IIb against N/2 HCl or N/2 H_2SO_4

Fiftieth Normal Potassium Hydroxide, N/50 KOH
- I against $KHC_4H_4O_6$
- IIa against N/50 HCl or N/50 H_2SO_4
- IIb against N/10 HCl or N/10 H_2SO_4

Half Normal Alcoholic Potassium Hydroxide, N/19 KOH al.
I against $KHC_4H_4O_6$
IIa against N/2 HCl or N/2 H_2SO_4
IIc against N/10 HCl or N/10 H_2SO_4

Tenth Normal Potassium Permanganate, N/10 $KMnO_4$
I against $Na_2C_2O_4$
IIa against N/10 Oxalic Acid, or N/10 Thiosulphate

Tenth Normal Potassium Sulphocyanate, N/10 KCNS
I against NaCl
IIa against N/10 $AgNO_3$; N/10 HCl; N/10 NaCl
IIb against N/2 HCl

Tenth Normal Silver Nitrate, N/10 $AgNO_3$
I against NaCl or as AgCl
IIa against N/10 KCNS; N/10 HCl; N/19 NaCl

Tenth Normal Sodium Chloride, N/19 NaCl
I as AgCl
IIa against N/10 $AgNO_3$

Half Normal Sodium Hydroxide, N/2 NaOH
I against $KHC_4H_4O_6$
IIa against N/2 HCl or N/2 H_2SO_4
IIc against N/10 HCl or N/10 H_2SO_4

Tenth Normal Sodium Hydroxide, N/10 NaOH
I against $KHO_4H_4O_6$
IIa against N/10 HCl or N/19 H_2SO_4
IIb against N/2 HCl or N/2 H_2SO_4
IIc against N/50 HCl or N/50 H_2SO_4

Fiftieth Normal Sodium Hydroxide, N/50 NaOH
I against $KHC_4H_4O_6$
IIa against N/50 HCl or N/50 H_2SO_4
IIb against N/10 HCl or N/10 H_2SO_4

Tenth Normal Sodium Thiosulphate, N/10 $Na_2S_2O_3$
I against Iodine
IIa against N/10 = $K_2Cr_2O_7$; N/10 $Na_2Cr_2O_7$; N/10 $KMnO_4$

Half Normal Sulphuric Acid, N/2 H_2SO_4
I against Na_2CO_3
IIa against N/2 KOH or N/2 NaOH
IIc against N/10 KOH or N/10 NaOH

Tenth Normal Sulphuric Acid, N/10 H_2SO_4
I against Na_2CO_3
IIa against N/10 KOH or N/10 NaOH
IIb against N/2 KOH or N/2 NaOH
IIc against N/50 KOH or N/50 NaOH

Fiftieth Normal Sulphuric Acid, N/50 H_2SO_4
I against Na_2CO_3
IIa against N/50 KOH or N/50 NaOH
IIb against N/10 KOH or N/10 NaOH

Copper Sulphate Solution of Fehling's, $CuSO_4$
I against Sugar
IIc against N/10 Thiosulphate (10 Cc. = 27.75 Cc. N/10 Thio.)

Iodo Bromide Test Solution, IBr T. S.
IIc against N/10 Thiosulphate

2. For use in class and in the laboratory, I have tabulated all the assays of the U. S. P. and N. F., volumetrically, gravimetrically, and electrolytically, and after the Latin abbreviation give the formula to be applied.

The list is as follows:

U. S. P. IX.

	Volumetric Latin Abbreviation.	Formula.		Volumetric Latin Abbreviation.	Formula.
1	Aceton.	IVa & IIIa	48	Calc. Chlor.	IVa & IIIa
2	Acid. Acet.	IIIa	49	Calc. Hypophos.	IVa & IIIa
3	Acid. Acet. Dil.	IIIa	49	Calc. Lact.	IIIa
4	Acid. Acet. Glac.	IIIa	50	Calc. Sulphid. Crud.	IVa & IIIa
5	Acid. Benz.	IIIa	51	Calx.	IVa & IIIa
6	Acid. Bor.	IIIa	52	Cglx. Chlorin	IIIa
7	Acid. Cit.	IIIa	53	Chloral. Hydrat.	IVa & IIIa
8	Acid. Hydriod. Dil.	IIIa	54	Chrom. Triox.	IIIa
9	Acid. Hydrobrom. Dil.	IIIa	55	Cret. Praep.	IVa & IIIa
10	Acid. Hydrochlor.	IIIa	56	Cupr. Sulph.	IIIa
11	Acid. Hydrochl. Dil.	IIIa	57	Emp. Bellad.	IVb & IIIa
12	Acid. Hydrocyan. Dil.	IIIa	58	Ext. Aconit.	IVb & IIIa
13	Acid. Hypophos.	IIIa	59	Ext. Bellad. Fol.	IVb & IIIa
14	Acid. Hypophos. Dil.	IIIa	60	Ext. Hyoscyam.	IVb & IIIa
15	Acid. Lact.	IIIa	61	Ext. Nuc. Vom.	IVb & IIIa
16	Acid. Nitric.	IIIa	62	Ext. Opii	IVb & IIIa
17	Acid. Phos.	IVa & IIIa	63	Ext. Physostig.	IVb & IIIa
18	Acid. Phos. Dil.	IVa & IIIa	64	Ext. Stramon.	IVb & IIIa
19	Acid. Salicyl.	IIIa	65	Ferr. Carb. Sacch.	IIIa
20	Acid. Sulph.	IIIa	66	Ferr. Chlor.	IIIa
21	Acid. Sulph. Arom.	IIIa	67	Ferr. & Ammon. Cit.	IIIa for Fe
22	Acid. Sulph. Dil.	IIIa	68	Ferr. & Quin. Cit.	IIIa for Fe
23	Acid. Tart.	IIIa	69	Ferr. Phos.	IIIa
24	Acid. Trichloracet.	IIIa	70	Ferr. Sulph.	IIIa
25	Aconit.	IVb & IIIa	71	Ferr. Sulph. Exsic.	IIIa
26	Ammon. Benz.	IIIa	72	Ferr. Sulph. Gran.	IIIa
27	Ammon. Brom.	IVa & IIIa	73	Ferr. Reduct.	IIIa
28	Ammon. Carb.	IIIa	74	Fldext. Aconit.	IVb & IIIb
29	Ammon. Chlor.	IVa & IIIa	75	Fldext. Bellad. Rad.	IVb & IIIb
30	Ammon. Iod.	IVa & IIIa	76	Fldext. Hyoscyam.	IVb & IIIb
31	Ammon. Salicyl.	IIIa	77	Fldext. Ipecac.	IVb & IIIb
32	Antimon, et Pot. Tart.	IIIa	78	Fldext. Nuc. Vom.	IVb & IIIb
33	Aq. Ammon.	IIIa	79	Fldext. Pilocarp.	IVb & IIIb
34	Aq. Ammon. Fort.	IIIa	80	Hydrarg. Chlor. Mite	IVa & IIIa
35	Arg. Nit.	IIIa	81	Hydrarg. Iod. Flav.	IVa & IIIa
36	Arg. Nit. Fus.	IIIa	82	Hydrarg. Oxid. Flav.	IIIa
37	Arg. Ox.	IIIa	83	Hydrarg. Oxid. Rub.	IIIa
38	Arsen. Iod.	IIIa	84	Hydrarg. Salicyl.	IVa & IIIa
39	Arsen. Triox.	IIIa	85	Hydrarg.	IIIa
40	Bellad. Fol.	IVb & IIIa	86	Hydrarg. cum. Cret.	IIIa
41	Bellad. Rad.	IVb & IIIa	87	Hyoscyam.	IVb & IIIa
42	Benzaldehyd.	IIIa, Blank IIa	88	Iodum.	IIIa
			89	Ipecac.	IVb & IIIa
43	Betaeucain. Hydrochl.	IIIa	90	Liq. Acid. Arsen.	IIIa
44	Caffein. Sod. Benz.	IIIa for Sod. Benz.	91	Liq. Ammon. Acet.	IVa & IIIa
			92	Liq. Arsen. et Hydrarg. Iod.	IIIa
			93	Liq. Calc.	IIIb
45	Calc. Brom.	IVa & IIIa	94	Liq. Ferr. Chlor.	IIIa
46	Calc. Carb. Praec.	IVa & IIIa	95	Liq. Ferr. Subsulph.	IIIa

U. S. P. IX (*Continued*).

Volumetric	Latin Abbreviation.	Formula.
96	Liq. Ferr. Persulph.	IIIa
97	Liq. Formaldehyd.	IVa & IIIa
98	Liq. Hydrog. Diox.	IIIa
99	Liq. Iod. Co.	IIIa
100	Liq. Plumb. Subacet.	IVa & IIIa
101	Liq. Pot. Arsen.	IIIa
102	Liq. Pot. Cit.	IIIa
103	Liq. Pot. Hydrox.	IIIa
104	Liq. Sod. Chlorinat.	IIIa
105	Liq. Sod. Arsen.	IIIa
106	Liq. Sod. Glycerophos.	IIIa
107	Liq. Sod. Hydrox.	IIIa
108	Liq. Zinc. Chlor.	IVa & IIIa
109	Lith. Brom.	IVa & IIIa
110	Lith. Carb.	IVa & IIIa
111	Lith. Cit.	IIIa
112	Magm. Mag.	IVa & IIIa
113	Mag. Carb.	IVa & IIIa
114	Mag. Oxid.	IVa & IIIa
115	Mag. Oxid. Pond.	IVa & IIIa
116	Mangan. Diox. Praec.	IVa & IIIa
117	Mass. Ferr. Carb.	IIIa
118	Mass. Hydrarg.	IIIa
119	Methyl Salicyl.	IVa & IIIa
120	Nux Vom.	IVa & IIIa
121	Ol. Amygd. Amar.	IVa & IIIa
122	Ol. Limon.	IVa & IIIa
123	Ol. Menth. PiP.	IVa & IIIa
124	Ol. Rosmar.	IVa & IIIa
125	Ol. Santal.	IVa & IIIa
126	Ol. sinap. Vol.	IVa & IIIa
127	Opii Pulv.	IVb & IIIa
128	Opium	IVb & IIIa
129	Opium Deod.	IVb & IIIa
130	Opium. Gran.	IVb & IIIa
131	Paraform.	IVa & IIIa
132	Phenol.	IVa & IIIa
133	Phenol. Liq.	IVa & IIIa
134	Physostig.	IVb & IIIa
135	Pilocarp.	IVb & IIIa
136	Plumb. Acet.	IVa & IIIa
137	Plumb. Oxid.	IVa & IIIa
138	Pot. Acet.	IIIa
139	Pot. Bicarb.	IIIa
140	Pot. Bitart.	IIIa
141	Pot. Brom.	IVa & IIIa
142	Pot. Carb.	IIIa
143	Pot. Chlor.	IVa & IIIa
144	Pot. Cit.	IIIa
145	Pot. et. Sod. Tart.	IIIa
146	Pot. Hydrox.	IIIa
147	Pot. Hypophos.	IVa & IIIa
148	Pot. Iod.	IVa & IIIa
149	Pot. Nitras.	IVa & IIIa
150	Pot. Permang.	IIIa
151	Pulv. Eff. Co.	IVa & IIa for $NaHCO_3$ IIIa for $KNaC_4H_4O_6$
152	Sod. Acet.	IIIa
153	Sod. Arsen.	IIIa
154	Sod. Arsen. Exsic.	IIIa
155	Sod. Benz.	IIIa
156	Sod. Bicarb.	IIIa
157	Sod. Bor.	IIIa
158	Sod. Brom.	IIIa
159	Sod. Cacodyl.	IIIa
160	Sod. Carb. Monohyd.	IIIa
161	Sod. Chlor.	IVa & IIIa
162	Sod. Cit.	IIIa
163	Sod. Cyan.	IVa & IIIa
164	Sod. Glycerophos	IIIa
165	Sod. Hydrox.	IIIa
166	Sod. Hypophos.	IVa & IIIa
167	Sod. Iod.	IVa & IIIa
168	Sod. Nitris	IIIa
169	Sod. Perbor.	IIIa
170	Sod. Phenolsulph.	IVa & IIIa
171	Sod. Phos.	IVa & IIIa
172	Sod. Phos. Exsic.	IVa & IIIa
173	Sod. Salicyl.	IIIa
174	Sod. Sulphis Exsic.	IVa & IIIa
175	Sod. Thiosulph.	IIIa
176	Stramon.	IVb & IIIa
177	Stront. Brom.	IVa & IIIa
178	Stront. Iod.	IVa & IIIa
179	Stront. Salicyl.	IIIa
180	Syr. Acid. Hydriod.	IVa & IIIa
181	Syr. Ferr. Iod.	IVa & IIIa
182	Theobrom. Sodio-Sal.	IIIa
183	Thymol. Iod.	IIIa
184	Thyroid. Sicc.	IIIa
185	Tr. Aconit.	IVb & IIIb
186	Tr. Bellad. Fol.	IVb & IIIb
187	Tr. Ferr. Chlor.	IIIa
188	Tr. Hyoscy.	IVb & IIIb
189	Tr. Iodi	IIIb
190	Tr. Nux Vom.	IVb & IIIb
191	Tr. Opii	IVb & IIIb
192	Tr. Opii Deod.	IVb & IIIb
193	Tr. Physostig.	IVb & IIIb
194	Tr. Stramon.	IVb & IIIb
195	Zinc. Carb.	IIIa
196	Zinc. Chlor.	IVa & IIIa
197	Zinc. Oxid.	IIIa
198	Zinc. Stear.	IVa & IIIa

U. S. P. IX (*Continued*).

	Gravimetric Latin Abbreviation.	Formula.
1	Alum. as AlO_3	Va
2	Alum. Exsic.	Va
3	Asafoet.	Va
4	Bism. Betanaph. as Betanaphthol	Va
	Bism. Betanaph. as Bi_2O_3	Va
5	Bism. et Ammon. Cit. as Bi_2O_3	Va
6	Bism. Subcarb. as Bi_2O_3	Va
7	Bism. Subgal. as Bi_2O_3	Va
8	Bism. Subnit. as Bi_2O_3	Va
9	Bism. Subsalicyl. as Bi_2O_3	Va
10	Caffein. Cit. as Caffeine	Va
11	Caff. Sod. Benz. as Caffeine	Va
12	Calc. Glycerophos. as CaO	Va
13	Canthar. as cantharidin	Va
14	Cinch. as cinchona	Va
15	Cinch. Rub. cinchona	Va
16	Colch. Corm. as colchicine	Va
17	Colch. Sem. as cochicine	Va
18	Collod. as pyroxylin	Va
19	Diastase	50 × starch
20	Ext. Colch. as colchicine	Va
21	Ext. Hydrast. as hydrastine	Va
22	Ferr. et Quin. Cit. as quinine	Va
23	Fldext. Cinchon. as cinchona	Vb
24	Fldext. Colch. Sem. as colchicine	Vb
25	Fldext. Guran. as caffeine	Vb
26	Fldext. Hydrast. as hydrastine	Vb
27	Glycer. Hydrast. as hydrastine	Vb
28	Guaran. as caffeine	Va
29	Hydrarg. Chlor. Corr. as HgS	Va
30	Hydrarg. Ammon. as HgS	Va
31	Hydrastis as hydrastine	Va
32	Jalap as resin	Va
33	Lin. Camph. as camphor	Polariscope
34	Liq. Iod. Co. for KI	Va
35	Liq. Mag. Cit. as magnesium pyrophosphate	Va
36	Magma Bis. as Bi_2O_3	Va
37	Mag. Sulph. as magnesium pyrophosphate	Va
38	Malt	5x starch
39	Pancreat.	25x starch
40	Pepsin	300x egg albumen
41	Podophyl. for resin	Va
42	Pot. sulphurat. for S	Va
43	Quin. et Urea Hydrochlor. for quinine	Va
44	Quin. Tann. for quinine	Va
45	Scam. Rad. for resin	Va
46	Sod. Sulphas as $BaSO_4$	Va
47	Sp. Camphor as camphor	Polariscope
48	Sulphur Bot. as $BaSO_4$	Va
49	Sulphur Praec. as $BaSO_4$	Va
50	Sulphur Sublim. as $BaSO_4$	Va
51	Tr. Cinchon. as quinine	Vb
52	Tr. Cinchon. Co. as quinine	Vb
53	Tr. Colch. Sem. as colchicine	Vb
54	Tr. Hydrast. as hydrastine	Vb
55	Tr. Iodi for Ki	Vb
56	Toxitabel. Hydrarg. Chlor. Corr. as HgS	Va
57	Ung. Hydrarg. Dil.	Va
58	Ung. Hydrarg. Dil.	Va
59	Uran. Nit. as U_3O_8	Va
60	Zinc. Acet. as ZnO	Va
61	Zinc. Phenolsulph. as ZnO	Va
62	Zinc. Sulph. as ZnO	Va
63	Zinc. Valer. as ZnO	Va
64	Zinc. as ZnO	Va

	Electrolytic Latin Abbreviation.	Formula.
1	Hydrarg. Chlor. Cor.	Va
2	Hydrarg. Chlor. Mit.	Va
3	Hydrarg. Iod. Flav.	Va
4	Hydrarg. Iod. Rub.	Va
5	Hydrarg. Oxid. Flav.	Va
6	Hydrarg. Oxid. Rub.	Va
7	Hydrarg. Salicyl.	Va
8	Hydrarg.	Va
9	Hydrarg. Ammon.	Va
10	Hydrarg. cum Cret.	Va
11	Toxitabel. Hydrarg. Chlor. Corr.	Va
12	Zinc. Acet.	Va
13	Zinc. Phenolsulph.	Va
14	Zinc. Sulph.	Va
15	Zinc. Valer.	Va
16	Zinc.	Va

VOLUMETRIC ASSAYS IN THE NATIONAL FORMULARY.

	Latin Abbreviation.	Formula.
1	Ext. Conii	IVb & IIIa
2	Ext. Ignat.	IVb & IIIa
3	Ferr. Oxid. Sacch.	IIIa
4	Fldext. Conii	IVb & IIIa
5	Fldext. Stramon.	IVb & IIIa
6	Liq. Ferr. Acet.	IIIa
7	Liq. Ferr. Cit.	IIIa
8	Liq. Hydrarg. Nit.	IIIa
9	Sulphur. Iod.	IIIa
10	Tr. Opii Crocat.	IVb & IIIb
11	Vin. Ipecac	IVb & IIIb

VOLUMETRIC ASSAYS IN THE NATIONAL FORMULARY (*Continued*).

	Latin Abbreviation.	Formula.		Gravimetric Latin Abbreviation.	Formula.
12	Acid. Formic.	IIIb	1	Fldext. Cinchon. Aq. as quinine	Vb
13	Ammon. Hypophos.	IVa & IIIa	2	Fldext. Colch. Corm. as colchicine	Vb
14	Ammon. Phos.	IVa & IIIa	3	Glycer. Bism. as Bi_2O_3	Vb
15	Antimon. Oxid.	IIIa	4	Liq. Alumin. Acet. as Al_2O_3	Vb
16	Antimon. Sulphuret.	IIIa	5	Liq. Alumin. Subacet. as Al_2O_3	Vb
17	Bromium	IIIa	6	Vin. Colch. Sem. as colchicine	Vb
18	Conium	IVb & IIIa	7	Alum. Chlor. as Al_2O_3	Va
19	Ferr. Glycerophos.	IIIa	8	Alum. Sulph. as Al_2O_3	Va
20	Ferr. Hypophos.	IIIa	9	Caff. Tost. as caffeine	Va
21	Ferr. Lact.	IIIa	10	Kola as caffeine	Va
22	Ferr. Pyrophos.	IIIa	11	Mangan. Cit. Sol. as Mn_3O_4	Va
23	Ignat.	IVb & IIIa	12	Mangan. Glycerophos. Sol. as Mn_3O_4	Va
24	Lith. Salicyl.	IIIa	13	Mangan. Sulph. as Mn_3O_4	Va
25	Magnes. Chlorid.	IVa & IIIa			
26	Mangan. Hypophos.	IVa & IIIa			
27	Ol. Bergam.	IVa & IIIa			

As 4 place logarithms are sufficiently accurate for almost all of the present pharmaceutical assaying, the E. F. of substances for N/2, N/10 and N/50 solutions, as found in U. S. P., can be easily changed into their corresponding logarithms. I have likewise made a list of these logarithmic equivalents, but have not put them into the body of this paper, because applying the rule for logarithms it is easy to find the one that is needed, or many chemical annuals give those values, but for convenience in pharmaceutical assaying I have listed them under headings N/2, N/10 and N/50 instead of under each volumetric solution, and have appended them to this paper, at the very close.

It may still appear useless and too far-fetched and beyond the average intellect of the pharmacy student to apply such a mathematical training to pharmaceutical assaying. Let me state, in closing, that when I presented this a year ago last summer to the conference of instructors at the University of Wisconsin, under the leadership of Dr. Edward Kremers, I was asked by Mr. Roland Kremers if I really taught such engineering rules to the pharmacy students. In reply, I said "I really did," and I still do so. It has been my peculiar experience, as a pharmacy student, to have been well grounded in engineering physics and mathematics, and these, combined with chemistry, pharmacology, physiology and pharmacy, have given me a little insight into some of the complexities found in pharmaceutical assaying.

If I can calculate the results correctly from the standardization of a volumetric solution to the assay of a crude drug, chemical, or their preparations by direct or residual titration inside of 5 to 10 minutes, once the data are obtained, and the tables at hand, I feel that the method is certainly a time and labor saving device, as well as accurate, and one that can be rechecked quickly. However, when I have several hundred mathematical calculations in pharmaceutical assaying to look over and correct, I personally use the slide rule, and it takes but a moment to see where errors and blunders have been made.

I could also append the discussion of experimental error, mathematical error; such as absolute error; percentage of error; and probable error; which is involved in

all pharmaceutical assaying, but I have purposely omitted it from this paper because it would make it quite lengthy, and is also an entirely different phase, yet very important in pharmaceutical assaying, and tells why some things are really difficult, and the accuracy that can be attained.

In order to show by concrete example how these formulas apply, consider the following example:

Given—4.704 Gm. $KHC_4H_4O_6$ require 45.82 mils N/2 NaOH for neutralization.

Also—48.75 mils N/2 H_2SO_4 neutralize 42.96 mils N/2 NaOH.

In assaying a sample of hydrated chloral, 3.039 Gm. of it, after the addition of 50 mils N/2 NaOH, standardized a above, in excess, upon residual titration, required 22.35 mils N/2 H_2SO_4.

What is the % strength of the hydrated chloral?

1st. Apply Formula I to get C. F. of N/2 NaOH.

log 4.704	0.6725	1 mil N/2 NaOH = 0.09407 = 8.9734 — 10
— log E. F. 0.09407	8.9734 — 10	
	1.6991	
— log mils — 45.82	1.6611	
= log C. F. N/2 NaOH	0.0380	= 1.091

2nd. Apply Formula IIa to get C. F. of N/2 H_2SO_4.

log 42.96	1.6320	
+ log 1.091	0.0380	
	1.5940	
— log 48.75	1.6879	
= log C. F. N/2 H_2SO_4	9.9061 — 10 = 0.8056	

3rd. Apply Formula IVa for residual titration.

log 50	1.6990	
+ log 1.091	0.0380	antilog or no.
	1.7370	= 54.58 mils N/2 NaOH 1.000 used in excess
log 22.35	1.3493	
+ log 0.8056	9.9061 — 10	
	1.2554	= 18.01 mils N/2 H_2SO_4 1.000 mils used in residual titration
		36.57 mils N/2 sol. 1.000 used by hydrated chloral

4th and lastly. Apply Formula IIIa for % of hydrated chloral.

log 3657	1.5630	
+ log 0.08270	8.9175 — 10	
+ log 100	2.0000	
	2.4805	
— log 3.039	0.4827	
= log %	1.9978	= 99.5%

LOGARITHMIC EQUIVALENTS.

No.	Chemical.	Formula.	N/2 Equivalent	Logarithm.
1	Acetic Acid	$HC_2H_3O_2$	0.03002	8.4774—10
2	Acetic Anhydride	$(CH_3CO)_2$	0.02551	8.4067—10
3	Ammonia Gas	NH_3	0.00852	7.9304—10
4	Ammonium Acetate	$NH_4C_2H_3O_2$	0.03854	8.5860—10
5	Ammonium Carbonate	$(NH_4)_2CO_3$	0.02402	8.3804—10
6	Ammonium Carbonate (U. S. P.)	$NH_4HCO_3.NH_4NH_2CO_2$	0.02619	8.4181—10
7	Ammonium Chloride	NH_4Cl	0.02675	8.4273—10
8	Barium Hydroxide	$Ba(OH)_2 + 8H_2O$	0.07888	8.8969—10
9	Benzaldehyde	C_7H_6O	0.05300	8.7243—10
10	Boric Acid	H_3BO_3	0.03101	8.4915—10
11	Borneol	$C_{10}H_{18}O$	0.07707	8.8869—10
12	Bornyl Acetate	$C_{10}H_{17}C_2H_3O_2$	0.09808	8.9916—10
13	Calcium Carbonate	$CaCO_3$	0.02502	8.3982—10
14	Calcium Hydroxide	$Ca(H)_2$	0.01852	8.2677—10
15	Calcium Lactate	$Ca(C_3H_5O_3)$ anhydrous	0.05454	8.7367—10
16	Calcium Oxide	CaO	0.01402	8.1467—10
17	Cinnamic Aldehyde	C_9H_8–O	0.03302	8.5188—10
18	Citral	$C_{10}H_{16}O$	0.07600	8.8808—10
19	Citric Acid, crystallized	$H_3O_6H_5O_7 + H_2O$	0.03502	8.5443—10
20	Formaldehyde	CH_2O	0.01501	8.1762—10
21	Hydrated Chloral	$C_2HOCl_3 + H_2O$	0.08270	8.9175—10
22	Hydrobromic Acid	HBr	0.04047	8.6070—10
23	Hydrochloric Acid	HCl	0.01824	8.2610—10
24	Hydriodic Acid	HI	0.06397	8.8060—10
25	Hypophosphorous Acid	HPH_2O_2	0.03303	8.5189—10
26	Lactic Acid	$HC_3H_5O_3$	0.04503	8.6535—10
27	Lead Acetate, crystallized	$Pb(C_2H_3O_2)_2 + 3H_2O$	0.09480	8.9768—10
28	Lead Subacetate, assumed as	$PB_2O(C_2H_3O_2)_2$	0.06853	8.8359—10
29	Lithium Carbonate	Li_2CO_3	0.01847	8.2664—10
30	Lithium Citrate, anhydrous	$Li_3C_6H_5O_7$	0.03498	8.5438—10
31	Lithium Citrate, crystallized	$Li_3C_6H_5O_7 + 4H_2O$	0.04699	8.6720—10
32	Lithium Salicylate	$LiC_7H_5O_3$	0.07199	8.8572—10
33	Magnesium Carbonate	$(MgCO_3)_4Mg(OH)_2 + 5H_2O$	0.02429	8.3854—10
34	Magnesium Hydroxide	$Mg(OH)_2$	0.01480	8.1703—10
35	Magnesium Oxide	MgO	0.01008	8.0033—10
36	Menthol	$C_{10}H_{20}O$	0.07808	8.8925—10
37	Menthyl Acetate	$C_{10}H_{19}C_2H_3O_2$	0.09909	8.9959—10
38	Methyl Salicylate	$CH_3.C_7H_5O_3$	0.07603	8.8810—10
39	Nitric Acid	HNO_3	0.03151	8.4984—10
40	Oxalic Acid	$H_2C_2O_4 + 2H_2O$	0.03153	8.4987—10
41	Paraformaldehyde	$(CH_2O)_3$	0.01501	8.1764—10
42	Phosphoric Acid	H_3PO_4 to form K_2HPO_4 P. T. S.	0.02452	8.3896—10
43	Potassium Acetate	$KC_2H_3O_2$	0.04906	8.6907—10
44	Potassium Bicarbonate	$KHCO_3$	0.05006	8.6995—10
45	Potassium Bitartrate	$KHC_4H_4O_6$	0.09407	8.9734—10
46	Potassium Carbonate	K_2CO_3	0.03455	8.5384—10
47	Potassium Citrate, anhydrous	$K_3C_6H_5O_7$	0.05106	8.7081—10
48	Potassium Citrate, crystallized	$K_3C_6H_7O + H_2O$	0.05406	8.7329—10
49	Potassium Hydroxide	KOH	0.02806	8.4481—10
50	Pot. & Sod. Tartrate, anhydrous	$KNaC_4H_4O_6$	0.05253	8.7204—10
51	Pot. & Sod. Tartrate, crystallized	$KNaC_4H_4O_6 + 4H_2O$	0.07055	8.8485—10
52	Santalol	$C_{15}H_{26}O$	0.11111	9.0457—10
53	Sodium Acetate, anhydrous	$NaC_2H_3O_2$	0.04101	8.6129—10

LOGARITHMIC EQUIVALENTS (*Continued*).

No.	Chemical.	Formula.	N/2 Equivalent	Logarithm.
54	Sodium Acetate, crystallized	$NaC_2H_3O_2 + 3H_2O$	0.06804	8.8328—10
55	Sodium Benzoate	$NaC_7H_5O_2$	0.07202	8.8574—10
56	Sodium Bitartrate	$NaHC_4H_4O_6 + H_2O$	0.09503	8.9778—10
57	Sodium Bicarbonate	$NaHCO_3$	0.04200	8.6232—10
58	Sodium Borate, anhydrous	$Na_2B_4O_7$	0.05050	8.7033—10
59	Sodium Borate, crystallized	$Na_2B_4O_7 + 10H_2O$	0.09554	8.9802—10
60	Sodium Cacodylate, anhydrous	$Na(CH_3)_2AsO_2$	0.08000	8.9031—10
61	Sodium Carbonate, anhydrous	Na_2CO_3	0.02650	8.4232—10
62	Sodium Carbonate, monohydrated	$Na_2CO_3 + H_2O$	0.03100	8.4914—10
63	Sodium Citrate, anhydrous	$Na_3C_6H_5O_7$	0.04301	8.6336—10
64	Sodium Citrate, crystallized	$Na_3C_6H_5O_7 + 2H_2O$	0.04901	8.6903—10
65	Sodium Glycerophosphate	$Na_2C_3H_7PO_6$	0.10805	8.0336—10
66	Sodium Hydroxide	$NaOH$	0.02000	8.3010—10
67	Sodium Salicylate	$NaC_7H_5O_3$	0.08002	8.9032—10
68	Sodium Tartrate, neutral	$Na_2C_4H_4O_6 + 2H_2O$	0.05752	8.7599—10
69	Strontium Salicylate, anhydrous	$Sr(C_7H_5O_3)$	0.09043	8.9563—10
70	Strontium Salicylate, crystallized	$Sr(C_7H_5O_3) + 2H_2O$	0.09943	8.9975—10
71	Sulphuric Acid	H_2SO_4	0.02452	8.3896—10
72	Sulphuric Anhydride	SO_3	0.02002	8.3014—10
73	Tartaric Acid, crystallized	$H_2C_4H_4O_6$	0.03751	8.5741—10
74	Trichloracetic Acid	CCl_3COOH	0.08170	8.9122—10
75	Zinc Oxide	ZnO	0.02034	8.3083—10

No.	Chemical.	Formula.	N/10 Equivalent	Logarithm.
1	Acetone		0.0009675	7.9857—10
2	Aconite ether soluble alkaloids		0.0645	8.8096—10
3	Aconitine	$C_{34}H_{47}O_{11}N$	0.06454	8.8099—10
4	Allyl-iso-thiocyanate	C_3H_5SCN	0.004956	7.6951—10
5	Ammonium Gas	NH_3	0.0017033	7.2311—10
6	Ammonium Benzoate	$NH_4C_7H_5O_2$	0.01391	8.1433—10
7	Ammonium Bromide	NH_4Br	0.009796	7.9911—10
8	Ammonium Chloride	NH_4Cl	0.005350	7.7284—10
9	Ammonium Iodide	NH_4I	0.014496	8.1614—10
10	Ammonium Salicylate	$NH_4C_7H_5O_3$	0.015508	8.1906—10
11	Antimony and Potassium Tartrate, crystallized	$K(SbO)C_4H_4O_6 + {}^1/_2H_2O$	0.016617	8.2206—10
12	Arsenic, in arsenous compounds	As	0.003748	7.5737—10
13	Arsenic Iodide	AsI_3? AsI_5	0.022786	8.3577—10
14	Arsenic Trioxide (Arsenous Acid)	As_2O_3	0.004948	7.6944—10
15	Arsenous Iodide	AsI_3	0.015191	8.1815—10
16	Atropine	$C_{17}H_{23}O_3N$	0.028919	8.4612—10
17	Barium Hydroxide	$Ba(OH)_2 + 8H_2O$	0.015776	8.1981—10
18	Benzoic Acid	$C_7H_6O_2$	0.015776	8.1981—10
19	Betaeucaine Hydrochloride	$C_{15}H_{21}ON.HCl$	0.028365	8.4529—10
20	Bromine	Br	0.007992	7.9026—10
21	Brucine	$C_{23}H_{26}O_4N_2$	0.039423	8.5957—10
22	Calcium Bromide, anhydrous	$CaBr_2$	0.0099955	7.9998—10
23	Calcium Bromide, crystallized	$CaBr_2 + 2H_2O$	0.0011798	7.0719—10
24	Calcium Carbonate	$CaCo_3$	0.0050035	7.6993—10
25	Calcium Chloride, anhydrous	$CaCl_2$	0.00555	7.7443—10
26	Calcium Chloride	$CaCl_2 + 2H_2O$	0.0073511	7.8664—10
27	Calcium Hydroxide	$Ca(OH)_2$	0.037045	7.5687—10
28	Calcium Hypophosphite	$Ca(PH_2O_2)_2$	0.002836	7.4527—10
29	Calcium Oxide	CaO	0.0028035	7.4478—10

LOGARITHMIC EQUIVALENTS (*Continued*).

No.	Chemical.	Formula.	N/10 Equivalent	Logarithm.
30	Calcium Sulphide, crude	CaS	0.003607	7.5571—10
31	Cephaeline	$C_{14}H_{19}O_2N$	0.023316	8.3678—10
32	Chlorine	Cl	0.003546	7.5497—10
33	Chromium Trioxide	CrO_3	0.003333	7.5228—10
34	Cinchonidine	$C_{19}H_{22}ON_2$	0.029420	8.4686—10
35	Cinchonine	$C_{19}H_{22}ON_2$	0.029420	8.4686—10
36	Cocaine	$C_{17}H_{21}O_4N$	0.030318	8.4817—10
37	Coniine	$C_8H_{17}N$	0.012715	8.1045—10
38	Copper Sulphate, anhydrous	$CuSO_4$	0.015964	8.1045—10
39	Copper Sulphate, crystallized	$CuSO_4 + 5H_2O$	0.024972	8.3974—10
40	Emetine	$C_{15}H_{21}O_2N$	0.024718	8.3931—10
41	Ferrous Bromide	$FeBr_2$	0.010784	8.0317—10
42	Ferrous Carbonate	$FeCO_3$	0.011584	8.0637—10
43	Ferrous Iodide	FeI_2	0.015484	8.1897—10
44	Ferrous Oxide	FeO	0.007184	7.8563—10
45	Ferrous Sulphate, anhydrous	$FeSO_4$	0.015191	8.1815—10
46	Ferrous Sulphate, crystallized	$FeSO_4 + 7H_2O$	0.027802	8.4440—10
47	Hydrastine	$C_{21}H_{21}O_6N$	0.038318	8.5834—10
48	Hydrochloric Acid	HCl	0.003647	7.5619—10
49	Hydrocyanic Acid, 1st ppt.	HCN	0.005404	7.7327—10
50	Hydrocyanic Acid, $KCrO_4$	HCN	0.002702	7.4316—10
51	Hydrobromic Acid	HBr	0.008093	7.9081—10
52	Hydriodic Acid	HI	0.012793	8.1069—10
53	Hydrogen Dioxide	H_2O_2	0.0017008	7.2306—10
54	Iodine	I	0.012692	8.1035—10
55	Iodine (Thymol Iodide)	I	0.002115	7.3253—10
56	Iron	Fe	0.002792	7.4458—10
57	Iron in Ferrous Compounds	Fe	0.005584	7.7469—10
58	Iron, in Ferric Compounds	Fe	0.005584	7.7469—10
59	Ipecac eth.	Ether soluble alkaloids	0.0240	8.3802—10
60	Lactic Acid	$HC_3H_5O_3$	0.009005	7.9544—10
61	Lead	Pb	0.010355	8.0151—10
62	Lead Acetate	$Pb(C_2H_3O_2)_2$	0.016257	8.2110—10
63	Lead Oxide	PbO	0.011155	8.0476—10
64	Lead Peroxide	PbO_2	0.011955	8.0778—10
65	Lead Subacetate	$Pb_2O(C_2H_3O_2)_2$	0.013706	8.1370—10
66	Lithium Bromide	$LiBr$	0.008686	7.9388—10
67	Lithium Chloride	$LiCl$	0.004240	7.6274—10
68	Manganese Dioxide	MnO_2	0.0043465	7.6382—10
69	Mercuric Iodide	HgI_2	0.022722	8.3562—10
70	Mercuric Nitrate	$Hg(NO_3)_2$	0.016231	8.2103—10
71	Mercury Oxide	HgO	0.01083	8.0347—10
72	Mercurous Chloride	$HgCl$	0.023606	8.3731—10
73	Mercurous Iodide	HgI	0.032752	8.5152—10
74	Mercury	Hg	0.01003	8.0012—10
75	Mercury (in mercurous compounds)	Hg	0.02006	8.3023—10
76	Morphine, anhydrous	$C_{17}H_{19}O_3N$	0.028516	8.4551—10
77	Morphine, crystallized	$C_{17}H_{19}O_3N + H_2O$	0.030318	8.4817—10
78	Mydriatic alkaloids, combined	Combined alkaloids	0.02892	8.4611—10
79	Nux Vomica	Combined alkaloids	0.0364	8.5611—10
80	Orcin	$C_7H_6(OH)_2$	0.002068	7.3156—10
81	Oxalic Acid	$H_2C_2O_4 + 2H_2O$	0.0063025	7.7996—10
82	Oxygen	O	0.0008	6.9031—10

LOGARITHMIC EQUIVALENTS (*Continued*).

No.	Chemical.	Formula.	N/10 Equivalent	Logarithm.
83	Phenol	C_6H_5OH	0.001568	7.1953—10
84	Phosphoric Acid	H_3PO_4	0.0032687	7.5144—10
85	Pilocarpine Physostigmine	$C_{15}H_{21}O_2N_3$	0.027520	8.4396—10
86	Pilocarpine	$C_{11}H_{16}O_2N_2$	0.020815	8.3185—10
87	Potassium Bitartrate	$KHC_4H_4O_6$	0.018814	8.2744—10
88	Potassium Bromate	$KBrO_3$	0.0027837	7.4446—10
89	Potassium Bromide	KBr	0.011902	8.0755—10
90	Potassium Chloride	KCl	0.007456	7.8726—10
91	Potassium Chlorate	$KClO_3$	0.0020427	7.3102—10
92	Potassium Cyanide, 1st ppt.	KCN	0.013022	8.1145—10
93	Potassium Dichromate	$K_2Cr_2O_7$	0.0049033	7.6905—10
94	Potassium Hydroxide	KOH	0.005611	7.7491—10
95	Potassium Hypophosphite	KPH_2O_2	0.003472	7.5406—10
96	Potassium Iodide	KI	0.016602	8.2201—10
97	Potassium Nitrate	KNO_3	0.010111	8.0047—10
98	Potassium Permanganate	$KMnO_4$	0.0031606	7.4998—10
99	Potassium Sulphite, crystallized	$K_2SO_4 + 2H_2O$	0.009715	7.9874—10
100	Potassium Sulphocyanate	KCNS	0.009718	7.9876—10
101	Quinine, anhydrous	$C_{20}H_{24}O_2N_2$	0.032421	8.5107—10
102	Resorcinol	$C_6H_4(OH)_2$	0.001834	7.2634—10
103	Salicylic Acid	$HC_6H_5O_3$	0.013805	8.1402—10
104	Silver	Ag	0.010788	8.0331—10
105	Silver Nitrate	$AgNO_3$	0.016989	8.2227—10
106	Silver Oxide	AgO	0.011588	8.0641—10
107	Sodium Arsenate, anhydrous	Na_2HAsO_4	0.0092985	7.9684—10
108	Sodium Arsenate, crystallized	$Na_2HAsO_4 + 7H_2O$	0.015604	8.1931—10
109	Sodium Bisulphite	$NaHSO_3$	0.005204	8.7163—10
110	Sodium Bromide	NaBr	0.010292	8.0123—10
111	Sodium Carbonate, anhydrous	Na_2CO_3	0.00530	7.7243—10
112	Sodium Chloride	NaCl	0.005846	7.7668—10
113	Sodium Chlorate	$NaClO_3$	0.0017743	7.2490—10
114	Sodium Cyanide, 1st ppt.	NaCN	0.009802	7.9913—10
115	Sodium Hydroxide	NaOH	0.004001	7.6022—10
116	Sodium Hypophosphite	$NaPH_2O_2 + H_2O$	0.0035357	7.6022—10
117	Sodium Iodide	NaI	0.014992	8.1759—10
118	Sodium Nitrate	$NaNO_3$	0.008501	7.9295—10
119	Sodium Nitrite	$NaNO_2$	0.0034505	7.5379—10
120	Sodium Oxalate	$Na_2C_2O_4$	0.0067	7.8261—10
121	Sodium Phenolsulphonate, anhydrous	$NaC_6H_5O_4S$	0.004903	7.6905—10
122	Sodium Phenolsulphonate, crystallized	$NaC_6H_5O_4S + 2H_2O$	0.0058035	7.7637—10
123	Sodium Phosphate, anhydrous	Na_2HPO_4	0.004735	7.6754—10
124	Sodium Phosphate, crystallized	$Na_2HPO_4 + 12H_2O$	0.011941	8.760 —10
125	Sodium Sulphite	Na_2SO_3	0.00634	7.8021—10
126	Sodium Thiosulphate, anhydrous	$Na_2S_2O_3$	0.015814	8.1990—10
127	Sodium Thiosulphate, crystallized	$Na_2S_2O_3 + 5H_2O$	0.024822	8.3949—10
128	Strontium Bromide	$SrBr_2 + 6H_2O$	0.017779	8.2500—10
129	Strontium Chloride	$SrCl_2 + 6H_2O$	0.013332	8.1249—10
130	Strontium Iodide	$SrI_2 + 6H_2O$	0.022479	8.3517—10
131	Strychnine	$C_{21}H_{22}O_2N_2$	0.033420	8.5240—10
132	Sulphuric Acid	H_2SO_4	0.0049045	7.6906—10
133	Sulphur Dioxide	SO_2	0.0032035	7.5056—10
134	Zinc Chloride	$ZnCl_2$	0.0068145	7.8334—10
135	Zinc Oxide	ZnO	0.0040685	7.6094—10

LOGARITHMIC EQUIVALENTS (*Concluded*).

No.	Chemical.	Formula.	N/50 Equivalent	Logarithm.
1	Aconitine	$C_{34}H_{47}O_{11}N$	0.012097	8.1109—10
2	Atropine	$C_{17}H_{23}O_3N$	0.0057838	7.7622—10
3	Cinchona	Combined alkaloids of	0.0061841	7.7913—10
4	Cinchonidine	$C_{19}H_{22}ON_2$	0.005884	7.7697—10
5	Cinchonine	$C_{19}H_{22}ON_2$	0.005884	7.7697—10
6	Cocaine	$C_{17}H_{22}ON_2$	0.0060636	7.7828—10
7	Coniine	$C_8H_{17}N$	0.002543	7.4053—10
8	Hydrastine	$C_{21}H_{21}O_6N$	0.0076636	7.8844—10
9	Ipecac	Combined alkaloids	0.0049034	7.6815—10
10	Morphine, anhydrous	$C_{17}H_{19}O_3N$	0.0057032	7.7561—10
11	Morphine, crystallized	$C_{17}H_{19}O_3N + H_2O$	0.0060636	7.7828—10
12	Physostigmine	$C_{15}H_{21}O_2N_3$	0.005504	7.7407—10
13	Pilocarpine	$C_{11}H_{16}O_2N_2$	0.004163	7.6194—10
14	Quinine	$C_{20}H_{24}O_2N_2$	0.0062842	7.7983—10
15	Strychnine	$C_{21}H_{22}O_2N_2$	0.006684	7.8251—10
16	Potassium Bitartrate	$KHC_4H_4O_6$	0.0037628	7.5755—10
17	Potassium Hydroxide	KOH	0.0011222	7.0500—10
18	Sodium Hydroxide	NaOH	0.0008002	6.9032—10
19	Sulphuric Acid	H_2SO_4	0.0009809	6.9916—10

DEPARTMENT OF PHARMACY,
UNIVERSITY OF NEBRASKA.

MEETING OF AMERICAN METRIC ASSOCIATION.

A metric meeting given by the New York Academy of Sciences and the American Metric Association was held at the American Museum of Natural History, New York, on Monday evening, November 4th.

The speakers were Dr. Robert Lowie, who presented the development of numbers and measurements from the times of primitive peoples to modern civilization, describing interestingly the early use of numbers and the mathematical notion in folk-lore; Mr. Howard Richards, Jr., who discussed the right usage of metric weights and measures; and Dr. Chester A. Reeds, who gave a geologist's estimation of the decimal method of computation in comparison with the systems used in America.

These papers were discussed by Dr. William Jay Schieffelin, Mr. Maximilian Toch, Mr. A. A. Cary, Dr. H. V. Arny and Mr. John Francis.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws, Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter.

TO THE BRANCHES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

On account of the campaign for the Fourth Liberty Loan, meetings of Branches were not held. Soon thereafter the prevalence of influenza interfered with the meetings, but it is hoped that the Branches will soon again begin holding their monthly meetings regularly. The JOURNAL will be pleased to receive the papers read at the Branches and recommended for publication.

Druggists of Wilkes-Barre, Pa., and vicinity organized the Luzerne County Branch of the American Pharmaceutical Association with fifty-one members. This shows the possibility of establishing many more Branches throughout the country, and the idea of inviting the pharmacists of the county wherein the Branch is to be organized to affiliate is a good one, and makes it possible to discuss business matters in which not only the druggists of one city are interested, but throughout the county. There are many topics of particular interest at the present time, especially in view of the fact that the beginning of the end of the war is at hand.

THE JOURNAL OF THE A. PH. A.
253 Bourse Bldg., Philadelphia, Pa.

CHICAGO.

The invitations to the ninety-seventh monthly meeting of the Chicago Branch of the American Pharmaceutical Association, to be held at the City Club October 17th, 8:00 P.M., announced as the topic of the meeting "Organized Pharmacy Is Doing Its War 'Bit' in a Great Big Way."

The presidents or secretaries of ten pharmaceutical organizations had been asked to respond with a ten-minute report on the war activities of their organization. Many acceptances had been received and arrangements completed for a dinner to precede the meeting when announcement was made by our State authorities that all public gatherings must be prohibited on account of the spread of the influenza epidemic. Therefore this meeting has been indefinitely postponed by order of the Executive Committee of the Chicago Branch. E. N. GATHERCOAL, *Secretary.*

CORRESPONDENCE

CORRECTION FOR ARTICLE ON SILVER COMPOUNDS.

October 24, 1918.

EDITOR JOURNAL OF THE AMERICAN PHARMACEUCICAL ASSOCIATION:

Correction for article on Silver Compounds, JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, August 1918, page 679, first and second lines of paragraph headed "Technic," should read:

"One Cc. of a 1:10 solution of the silver salt is diluted with 10 Cc. of distilled water and shaken with 0.5 Gm. of 'Lloyd's Reagent,' etc."

Very truly yours,

(Signed) TORALD SOLLMANN.

Cleveland, October 24, 1918.

DEFERRED CLASSIFICATION FOR PHARMACISTS.

EDITOR JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

I am happy to be able to state that as the result of an effort on my part as per correspondence which I give below, I have secured a decision by the Surgeon General and the Provost Marshal General Crowder, to the effect that drug clerks and registered pharmacists be not drafted into the Army during the influenza epidemic, and that thereafter a deferred classification should be given them if they can show, as practically all of them can, that their position is "necessary to the enterprise in which they are engaged." This is the first successful effort made to have pharmacy recognized as an essential profession and industry, and this should be promptly followed up and given all the publicity possible, so as to get behind our movement for a pharmacy corps public sentiment through the press:

"Baltimore, October 10th, 1918.

"TO THE SURGEON GENERAL'S OFFICE,
"WASHINGTON, D. C.

"GENTLEMEN:

"On behalf of the pharmacists and pharmaceutical colleges of this country I am again addressing you in this emergency brought to the attention of the people and the medical profession by the epidemic now raging all over the land. I appeared before your office with seventeen other representative gentlemen representing the National Drug Trade Conference in behalf of recognition of pharmacy as an essential industry and profession, on September 26th, and were heard by General Richard and Colonel Darnell. You refused to recognize pharmacy as an essential industry and as a needed branch in the army establishment. Today the country is confronted by a demand for pharmacists' skill and services unprecedented in its history. Pharmacies by the hundred are being closed because their owners or their registered clerks are being drafted into the army. The result is, pharmacies by the hundreds everywhere, are overrun with prescriptions for the epidemic and they have to close their stores because they cannot handle the work, and many are working all night and day. Therefore, the Provost Marshal, under the advice of the Surgeon General's office, should give registered pharmacists in the draft deferred classification to enable the civilian population to secure their medicines. Hundreds and thousands of patients are unable to procure medicines during the past few days and more and more pharmacists are lying down sick from overwork and worry which is fast bringing on a crisis all over the east. It would seem that pharmacy is today being shown to be one of the direst needs of the public and the medical profession to help quell the epidemic and save the lives of our people. Will the Surgeon General's office still refuse to recognize the need of the people today for pharmaceutical service? Please inquire of health boards in any of our cities and let them tell you of the deplorable conditions in the dispensing of medicines. Dr. John D. Blake, the health commissioner of Baltimore, told us today that he felt the Surgeon General's office had made a mistake in refusing to recognize pharmacy, and should do so, and induce Provost Marshal Crowder to release many of the pharmacists in the draft for return to their stores to help out the fighting of this epidemic in this country by giving them deferred classification. I am enclosing a clipping from today's *Baltimore Sun* on the subject. The Educational Board also should recognize pharmacy students as worthy of forming, if necessary, in conjunction with other units military organizations, so that our colleges of pharmacy will not have to close and cut off the future supply of pharmacists so urgently needed at all times for the public health, and especially so badly needed now.

"Respectfully submitted,
"(Signed) A. R. L. DOHME."

A copy of this same letter was simultaneously sent to Provost Marshal General Crowder, Surgeon General Rupert Blue of the Public Health Service, and Prof. Charles E. Munroe, Chairman of the Board of Educational Instruction.

The following reply was received under date of October 16th from the Provost Marshal General:

"DR. A. R. L. DOHME,
"MEMBER EXECUTIVE COMMITTEE,
"AMERICAN DRUG MANUFACTURERS ASSOCIATION,
"CR. SHARP & DOHME, S. W. COR. PRATT & HOWARD STS.,
"BALTIMORE, MARYLAND.

"DEAR SIR:

"I have read with interest copy of your letter of October 10th, addressed to the Surgeon General's Office, in which the importance of pharmacy as a necessary industry is submitted. In order to overcome the situation brought about as a result of drug clerks being drafted into the Army and the heavy demands that are made upon pharmacists at the present time, it has been suggested that this office release many of the pharmacists who have been called to the colors and grant them a deferred classification so that they may resume their civilian employment and assist in fighting the epidemic.

"Upon induction of a registrant into military service the jurisdiction of the Selective Service Law and of this office terminates, and all questions pertaining to the release of soldiers from the Army are consequently for the determination of the military authorities. Hence the suggestion advanced by the Health Commissioner of Baltimore could not be put into effect by this office.

"As far as the selection of men for military service is concerned, the matter lies entirely in the hands of District Boards, which are authorized by the Selective Service Law, to consider claims for deferred classification based upon engagement in industries, occupations, or employments. The recognition of a particular trade or business as an 'essential' industry, occupation or employment is not binding upon District Boards which, in considering claims for deferment based on industrial or occupational grounds, must find, first: whether the industry, occupation or employment is 'necessary' to the maintenance of the Military Establishment, the effective operation of the military forces, or the maintenance of national interest during the emergency, and, second, whether the individual himself is, within the meaning of the Law, 'necessary' to the enterprise in which he is engaged.

"E. H. CROWDER,
"Provost Marshal General.

"(Signed) By ROSCOE S. CONKLIN,
Lieut. Colonel, J. A., Chief, Classification Division."

and from the Surgeon General's office under date of October 18th has come in response to my letter the statement that the Surgeon General's office has recommended to the Provost Marshal that drug clerks and pharmacists be not drafted into the Army during the influenza epidemic.

I feel that this information should go out at once through all pharmaceutical journals to the pharmacists of the country so that they may be benefited promptly by the decision of the Army chiefs. While I have had no reply yet from the Educational Committee, I have heard that colleges of pharmacy are being taken care of by permitting pharmacy students to join Army Reserve Units at educational institutions and I hope that every college of pharmacy will not fail to use this information to the utmost in helping itself to maintain its position and courses, and induce young men to continue to pursue its courses, for provision for future pharmacists must be made in the interest of public health and welfare.

If we had adopted and put into effect federated pharmacy with a central office and an efficient, well-paid publicity department, we could have handled this epidemic and draft situation much more promptly and effectively.

Our hope now is that pharmacists will realize the value of coöperation and federation, and not let the narrow views of a certain few men high in authority in certain associations, prevent the accomplishment of a much-needed federated effort and organization in pharmacy.

I am also informed that many of the pharmacists in the army camps among the drafted men have returned to their homes for service in this epidemic emergency; at least that is the case at Camp Meade, here near Baltimore.

Very truly yours,

Baltimore, October 23, 1918. (Signed) A. R. L. DOHME.

REPORT OF CONFERENCE ON SPECIAL BULLETIN ON PROGRAM IN PHARMACY.

TO THE PHARMACEUTICAL PROFESSION OF AMERICA:

Under date of October 1, 1918, the War Department's Committee on Education and Special Training issued a Special Bulletin on Program in Pharmacy. This program is being given publicity in the current pharmaceutical press and will in this way be called to the attention of all interested. However, Dr. E. L. Newcomb, of the *Northwestern Druggist*, has suggested and others have requested, that an official statement be made concerning a Conference recently held in Washington relative to this matter. This conference was called by the Committee on Education and Special Training through the Educational Director, Dr. R. C. Maclaurin.

Delegates from a number of representative colleges were requested by wire to meet with the War Committee on September 29th, at 10:00 A.M., Old Land Office Building, Washington, to discuss the relation of students in the Colleges of Pharmacy to the S. A. T. C. The Institutions asked to send delegates were the Massachusetts College of Pharmacy, The University of North Carolina, the School of Pharmacy of the Medical College of Virginia, Columbia University, Western Reserve University, Purdue University and the Universities of Michigan, Minnesota and Nebraska. All of these institutions were represented at the Conference except the first two named.

At the time and place appointed the delegates met representatives of the Educational Committee. Doctor Maclaurin briefly and clearly announced the reasons for the call to Washington. The following is the substance of his statement.

The War Department had decided for the efficiency of the Army Medical Service to prepare for a pharmacy unit in the S. A. T. C. Furthermore, it is the intention of the War Department to retain a sufficient number of pharmacy students in school so that the civilian population shall not suffer because of a lack of properly qualified pharmacists. He stated that no school could be considered as an S. A. T. C. institution which did not require at least a four-year high school course for entrance or could come to such a requirement on very short notice, and furthermore, schools of a purely commercial type would not be considered. The amount of military instruction and training which would be required by the War Department of students in the S. A. T. C. was stated and Dr. Maclaurin then asked that the representatives present organize as a committee and work out a pharmacy program running through eight quarters of three months each, which would, in the opinion of the committee, best accomplish what the War Department has in mind to do. The Program which was worked out is issued as Special Bulletin on Program in Pharmacy. (See next report.)

Dr. Maclaurin also asked the committee to give information concerning the Colleges of Pharmacy which would help the Committee on Special Training to determine the fitness of the various schools to become S. A. T. C. institutions. This the Committee did to the best of its ability, but the information given was only for the purpose of giving the War Committee something tangible to build upon. It is safe to say that the college representatives felt when confronted by this problem, as never before, what it would mean to pharmaceutical education if we could have had the results of a Carnegie Foundation investigation and classification to present to the War Committee.

The Chairman wishes to say in closing that the attitude of Dr. Maclaurin and the other members of the War Committee toward the representatives of the Colleges was courteous, dignified, respectful and, perhaps above all, was sympathetically helpful in the problems they were asked to solve. We feel that one more incident has occurred which will assure to professional pharmacy a greater future. (Signed) RUFUS A. LYMAN, *Chairman*.

The Committee:

GEO. F. DIEKMAN, 115 W. 68th St., New York City.
CHAS. B. JORDAN, Purdue University, La Fayette, Ind.
HENRY KRAEMER, University of Michigan, Ann Arbor, Mich.
WORTLEY F. RUDD, Medical College of Virginia, Richmond, Va.
F. J. WULLING, University of Minnesota, Minneapolis, Minn.
EDWARD SPEASE, Secretary, Western Reserve University, Cleveland, Ohio.
RUFUS A. LYMAN, *Chairman*, University of Nebraska, Lincoln, Nebr.

THE UNIVERSITY OF NEBRASKA,
LINCOLN, NEB., October 25, 1918.

WAR DEPARTMENT.

COMMITTEE ON EDUCATION AND SPECIAL TRAINING.

SPECIAL BULLETIN ON PROGRAM IN PHARMACY.

The program here presented is not prescribed, but is an example of what will be approved. It is intended to indicate how existing programs may be modified by elimination and condensation so as to meet the needs of the present emergency. The program covers eight terms of twelve weeks, but it must not be inferred that every student entering on such a course will be kept at college until he completes it. The time that he will be permitted to pursue the course will depend on the needs of the service and the academic record of the student. In addition to the instruction indicated in the program, eleven hours per week of military instruction are prescribed for the first three terms of the program, and six hours per week for the remainder of the program. The total time to be devoted to military and academic instruction, including examinations, lectures, recitations, laboratory work and supervised study, is 53 hours per week. The hours set forth in the program represent the total time devoted each week to the subjects named. The relation of the time given to study to that assigned to lectures, recitations and laboratory work varies considerably with the nature of the subject, but on the average the former is not more than half of the total time allotted. The subject, War Issues, which must be combined with English Composition, is, with the exceptions indicated in Section 26 of the Regulations of the S. A. T. C., prescribed for three terms with nine hours per week for lectures, recitations and study.

APPROVED PHARMACY WAR COURSE.

	Hours per week.
FIRST TERM.	
Chemistry	12
Pharmacy	9
Botany	6
Physiology and Hygiene	6
War Aims and English Composition	9
SECOND TERM.	
Chemistry	12
Pharmacy	9
Pharmacognosy	6
Physiology and Hygiene	6
War Aims and English Composition	9
THIRD TERM.	
Chemistry	12
Pharmacy	9
Pharmacognosy	6
Pharmacology and Posology	6
War Aims and English Composition	9
FOURTH TERM.	
Chemistry	15
Pharmacy	15
Pharmacology and Posology	5
Bacteriology	12
FIFTH TERM.	
Chemistry	15
Pharmacy and Dispensing	15
Bacteriology	12
Pharmacology and Posology	5
SIXTH TERM.	
Chemistry	15
Pharmacy and Dispensing	24
Preparation of Diagnostic Reagents	5
First Aid	3

SEVENTH TERM.	Hours per week.
Chemistry	15
Pharmacy and Dispensing	15
Pharmacopoeial Assay	12
Urinalysis	5
EIGHTH TERM.	
Chemistry	15
Pharmacy and Dispensing	23
Applied Microscopy	9

COMMITTEE ON EDUCATION AND SPECIAL TRAINING,
By R. C. MACLAURIN,
Educational Director, Collegiate Section.

October 1, 1918.

AMERICANIZATION OF FORMER ENEMY-OWNED CONCERNS.

Many inquiries regarding the status of the Bayer Company and other enemy-owned concerns taken over by the Alien Property Custodian and the ultimate disposal of the money received from the sale of such concerns have come to the Alien Property Custodian's office. In order to clear up what seems to be a general misunderstanding regarding the functions of this office and the scope of its work, A. Mitchell Palmer, Alien Property Custodian, has made the following statement:

"The office of Alien Property Custodian was created by the 'Trading with the Enemy Act,' which was approved October 6, 1917. Under the provision of this Act, the Alien Property Custodian is directed to hold, administer and account, under the general direction of the President, for all enemy property he has taken over. The Act provides that after the end of the war, 'any claim of any enemy or of an ally of enemy to any money or other property received and held by the Alien Property Custodian, or deposited in the United States Treasury, shall be settled as Congress shall direct.' The Act also directs the Alien Property Custodian to deposit in the Treasury of the United States the proceeds of the sale of any property in his custody, to be invested in bonds.

"It can readily be seen therefore, that the functions of the Alien Property Custodian are merely those of a trustee, that all enemy money and property taken over by him is held in trust, and that Congress has reserved to itself the final disposition of such property.

"The Bayer Company, like all other companies taken over by me, is not now enemy-owned, and never will be enemy-owned again. All the stock is now held by the Alien Property Custodian representing the United States Government, and it is being operated by one hundred percent Americans as an American concern. The Bayer Company will be sold at public auction on December 3rd to American citizens only. Before the sale is finally consummated by me, it will be passed upon by the Advisory Committee, of which Otto T. Bannard, of New York, is Chairman.

"This course will be followed with each of the two hundred or more concerns which are now in my custody. I am going to put upon the auction block every one of the great industries in America, which formerly were German-owned, and sell them to American citizens.

"The policy of the Government, as fixed by the Act of Congress, is to sell these properties to American citizens as going concerns for fair and adequate values, and I would not be performing my duty in the carrying out of that policy if I did not operate the properties, pending sale, in the same efficient and profitable manner that they have heretofore been operated. If these properties are destroyed, there will be nothing to sell to American citizens.

"The Americanization of the former enemy-owned concerns in my custody is a big task, and it requires the heartiest coöperation of the business men of this country to be successful. The German agents have had their hands on practically every important American industry. They acquired large interests in the chemical and drug, the lumber, the dyestuff, the metal, the shipping, the textiles, the woolen, the cotton, and practically every other vital industry in this country. The value of the German ownership in these concerns is upward of three hundred million dollars. I propose to wipe out every trace of this German ownership by selling these properties to one hundred percent Americans.

"On December 4th, Heyden Chemical Works, at Garfield, N. J., will be sold at public auction."

COMMITTEE REPORTS

REPORT OF THE SUB-COMMITTEE OF THE A. PH. A., OF THE JOINT COMMITTEE ON NOMENCLATURE OF CULTIVATED PLANTS.*

The catalogue of scientific and popular names of shrubs and trees that was published last year by the Joint Committee, and copies of which were distributed at the preceding meeting of this Association, has accomplished considerable good. It did not adhere strictly to proper rules of nomenclature, because the Committee was obliged to compromise with a purely commercial element that was not sufficiently considerate of the just claims of science upon those whose business success was made possible by the benefits that science had conferred upon them. Nevertheless, even this element conceded something, so that a step was taken in the direction of correct nomenclature.

Another result attained was that of forcing consideration and discussion of the principles of nomenclature, even upon those who are opposed to them. If we can once get a question of right and wrong up for discussion, we may confidently depend upon the correct side to gain in strength, however slowly, as the discussion proceeds.

A third result has been that of securing some uniformity in the matter of violations of principle. If people are to violate a rule, there is at least a practical advantage in getting them to agree on a single incorrect form, thus lessening confusion, costly mistakes and discomforting disputes.

It should therefore be accepted that the first work of the Committee has brought forth valuable fruits.

It is planned to go ahead with this work along the same lines, taking up another group of plants, the nomenclature of which is in great disorder. Much work in this direction has already been done since our last meeting by individuals and sub-committees and the plans for future work are of a very definite character. I will say now as I said last year, that the great majority of plants under consideration by the Committee have no direct application to medicine or pharmacy, but that both professions, and especially pharmacy, have a strong indirect interest in securing general accuracy and stability in plant names, and I trust that the Association will not take a narrow view of its obligations but will continue to coöperate in this work, the results of which will be monumental in applied botany.

I would like to refer especially to the work of my colleague, Mr. Farwell, in this bibliographical enterprise. He is exceptionally favored by having access to extensive library and herbarium facilities and has a keen interest and special ability in this line of work.

Should the Association so desire, I will be glad to submit a detailed report of progress and plans for printing in the Association Journal.

I have two recommendations upon which I should like the action of the Association:

The first is that the Association should appropriate $150 for the expenses of the Joint Committee. All this money is economically expended for the most necessary purposes. Contributions range from $150 to $300 from the different organizations concerned, and there are various individual contributions also. Last year I secured $190 from friends in the Association and this would be possible again although it is neither right nor desirable. If the Association is interested in the work and maintains a sub-committee, it ought to contribute as an organization.

The second recommendation is that we should express our opinion on a proposition to drop the final "i" from such names as "Dillenii" and "Fabii." These names are the genitive forms, respectively, of "Dillenius" and "Fabius," and according to every rule of nomenclature should end in two "i's." In the case of the genitive form of "Brutus," we should, of course, have but a single "i." Some of the correspondents of the Joint Committee who are either not versed in the rules of the subject or who are not properly interested in them wish to drop the final "i" from the botanical name simply as a matter of convenience. While we should not seriously

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* Presented at Second General Session, A. Ph. A., Chicago meeting, 1918. The item of expense was referred to the Council, and the second resolution to the Committee on Resolutions and afterward favorably reported and approved. (See minutes of Final General Session.)

oppose juggling with common names, in the interest of practicality, we feel that the botanical names should be respected. We therefore submit the following resolution and trust that you will adopt it.

WHEREAS, Botanical names are essentially foreign in origin and form, and should be dealt with in accordance with the rules of the language to which they pertain; therefore it is

Resolved, That in the opinion of the American Pharmaceutical Association, the Joint Committee on Nomenclature should not drop the final 'i" of specific botanical names which retain them in accordance with such rules.

Respectfully submitted,

H. H. RUSBY, *Chairman*.

REPORT OF THE COMMITTEE ON THE NATIONAL FORMULARY.*

Your Committee on National Formulary has been occupied during the past year with a consideration of plans for the next revision of the National Formulary. During the last revision confusion and delay resulted at times because of misunderstandings regarding the plan of the work, and it became evident that an efficient plan at the start for the work of revision is an important factor in the obtaining of results. At the meeting of the Association at Atlantic City this Committee made the following recommendation, which was afterward adopted by the Council:

"We recommend that with the appointment of the (next) committee general principles be outlined for the guidance of the revision, and that thereafter the final decision on all questions pertaining to the revision be left to the Committee."

The plans which the present committee has considered pertain only to the method of distributing the work, and do not include general principles for the control of the revision. The system which we herewith propose is not intended to be mandatory, but only to give to our successors the benefit of our experience in the work of revision and to suggest means by which the work may be expedited. Future conditions will probably demand some changes in the details, and it is not intended to hamper in any degree the judgment or desires of the next committee by a closed method for the revision.

With this interpretation we recommend that the work of the next committee be based on the following plan:

Time.—That future revisions of the National Formulary should be made simultaneously with those of the United States Pharmacopoeia.

Organization.—Future committees should consist of 15 members, to be appointed each ten years by the Council of the American Pharmaceutical Association. The officers of the committee should consist of a Chairman, Vice-Chairman and Secretary, to be elected by the committee.

Plan of Work.—The committee should apportion its work to the following sub-committees which shall report to the general committee:

1. On Admissions, Deletions and Nomenclature.
2. On Botany and Pharmacognosy.
   (To have charge of the preparation and revision of text for vegetable drugs in Part II.)
3. On Chemistry and Assays.
   (To prepare text or revise the text for chemicals in Part II, and to add or revise such assay processes as are needed throughout the book.)
4. On Doses.
5. On Elixirs.
6. On Syrups, Spirits and Wines.
7. On Fluidextracts.
8. On Fluidglycerates and Tinctures.
9. On Infusions, Liquors, Mixtures, and Emulsions.

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* Read before Section of Practical Pharmacy and Dispensing and referred to the Council.

10. On Pills, Powders, Species, Effervescent Salts, Troches, Pastes, and Pencils.
11. On Glycerogelatins, Liniments, Lotions, Nebulae, Mulls, Oleates and Ointments.
12. On Miscellaneous Preparations not included in the above.

The above division of work is more equable than may appear on first reading and it conforms to natural divisions. It may be modified in detail as conditions demand.

Considerable attention was paid to the question of increasing the number of members from 15 to 25, but after discussion it was decided to recommend the present number of members, as is required in the Association By-Laws. While an increased membership would lighten the demand for laboratory work on individual members, it prevents as many personal conferences as fifteen members may hold, and one day of conference of this kind can accomplish as much as many weeks of work by correspondence. A smaller committee also is more prompt in its work, is usually more harmonious, and saves much time in correspondence.

The question of alternate formulas, or the temporary dropping of formulas for preparations containing glycerin or sugar, as a war measure, has also received attention. This question was brought to us from several sources, and at first a considerable sentiment was displayed toward extreme conservation of glycerin and sugar. But the necessity for such measures has not yet appeared sufficiently urgent for action, and the matter is held in abeyance.

When it is considered that the total amount of sugar used in pharmaceutical preparations of all kinds is less than half as much as is used in tobacco, less than is used in chewing-gum and less than a tenth of that used in soft drinks, it does not seem needful that the sick should be the first to be deprived of their share of pleasure.

No figures are yet available for glycerin, but we can depend upon an imperative demand being made by the War Department if stringent conservation of glycerin should become necessary. So at present the committee is following the policy of watchful waiting on these questions.

The question of issuing a supplement in 1919 has also received attention. At present there appears no marked demand for such, and official changes in formulas or additional official formulas within the ten-year periods are troublesome to pharmacists and unless really necessary are inadvisable. Under present conditions official changes are especially unwelcome and thus far criticisms of the National Formulary IV do not indicate a need of immediate revision. Therefore, unless war conditions should develop some situation which calls for immediate action within the next year, this present committee may consider its work as finished.

Respectfully,

WILBUR L. SCOVILLE, *Vice-Chairman.*

REPORT OF COMMITTEE ON PHYSIOLOGICAL TESTING.*

Athough concerted experiments by the Committee are lacking, largely for the reason stated by its Chairman, there has been considerable work along the lines of Biological Standardization which seemed of sufficient importance to summarize.

The bibliography herewith submitted, with short abstracts of articles, may not be complete but includes all that came to the Chairman's attention. Several of these must be noted by title only, as neither the article nor an abstract could be found on short notice.

ABSTRACTS AND BIBLIOGRAPHY OF PHYSIOLOGICAL STANDARDIZATION, 1917–1918.

"*den Besten und de Lind von Syngaarden*, Physiological Standardization of Digitalis Preparations upon warm blooded animals," *Nederl. Tydschr. Geneesch.*, Amsterdam, 1917, 2, p. 479.

Colson, "Biological Standardization of the Heart Tonic Preparations," JOURNAL A. PH. A., 1918, 7, 13.

Tests were carried out by the M. S. D. Frog Method and the Cat Method, slightly modified. He concludes that the former is subject to too many variables to make it practicable or

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* Presented at second General Session, A. Ph. A., Chicago meeting, 1918. Chairman E. M. Houghton stated that owing to press of other work in connection with the manufacturing of supplies for the U. S. Government (U. S. Army Medical Service), the members of the Committee were unable to prepare a report, but present this in lieu of it to show the progress of the year in physiological testing.—EDITOR.

accurate and that the Cat Method has much to recommend it. He admits that the Cat Method belongs to the toxic type of assay but is convinced that the digitalis action is on the heart and not on the respiratory centers.

Colson and Engelhardt, "Is the Biological Standard of Squill and the Preparations thereof Correct? JOURNAL A. PH. A., 1917, 6, p. 950.

The authors submit data of tests of squill by three methods, the M. L. D., M. S. D., and Cat Methods, and claim that the U. S. P. standards for squill are incorrect, the toxicity by the Cat Method being only one-half that of digitalis.

Eckler, "On the Deterioration of Crude Indian Cannabis," JOURNAL A. PH. A., 1917, 6, p. 872.

The author shows by tests that the attic-stored crude drug loses its activity entirely in 5 years, while in a cool basement the average yearly loss is only one-half as great.

Eckler, "Apparatus for Studying the Effect of Drugs on the Isolated Guinea Pig Uterus," *Journ. of Lab. and Clin. Med.*, 1917, 2, p. 819.

This is a detailed description with cuts showing an apparatus designed to control the various factors concerned in the assay of pituitary extracts on the isolated guinea pig uterus.

Focke, "*Ueber die physiologische Wertmessung des Digitalysate*," *Zeitschr. f. Exp. Path. & Therapie*, 1916, 18, p. 382.

Hamilton, "Biological Standardization," *Amer. Journ. of Pharm.*, 1917, 89, p. 61.

The author criticizes the methods or the technic adopted by the U. S. P. Revision Committee for the biological assay of cannabis, adrenalin and pituitary products and the digitalis series of heart tonics, pointing out errors and suggesting improvements.

Hamilton, "The Stability of Cannabis and Its Extracts," JOURNAL A. PH. A., 1918, 7, p. 333.

The author takes issue with Eckler as to the rate of deterioration of cannabis, showing results of the drug 15 and 21 years old as being still 75 and 30 percent of standard. The drug was kept in bottles on the laboratory shelves.

Hamilton, "The Deterioration of Digitalis Extracts," JOURNAL A. PH. A., 1918, 7, p. 433.

The author points out that while some samples of digitalis tincture have deteriorated greatly in a short time the average deterioration is far below that observed by Pittenger and Mulford, Jr.

Hall and Hamilton, "Investigation on the Composition of Oil of Chenopodium and the Anthelmintic Value of Some of Its Components," *Journ. of Pharm. and Exper. Therap.*, 1918, 61, p. 231.

The authors show by tests of oil of chenopodium and of various fractions of the oil that while the activity is not improved, the objectionable features are largely eliminated by selecting a fraction—about 70 percent—rather than using the whole oil as an anthelmintic.

Krogh, "The Physiological Standardization of Digitalis." *Ugeskr. f. Laeger*, 1917, 79, p. 475.

This author assayed digitalis preparations by use of the isolated frog's heart, selecting as the endpoint the amount of drug, applied by perfusion, necessary to arrest spontaneous contraction. He considers the method accurate within 10 percent.

Morris, "Standardization of Digitalis and Potency of the Minnesota Leaf," *Journal Lancet*, 1917, p. 176.

Pittenger, "Biological Assay Methods of U. S. P. IX," JOURNAL A. PH. A., 1917, 6, p. 865.

This is a critical review of the biologic assay methods of the U. S. P., with suggestions for improving the technic and as to the standards employed.

Pittenger, "An Improved Apparatus for Testing the Activity of Drugs on the Isolated Uterus," JOURNAL A. PH. A., 1918, 7, p. 512.

This is a detailed description of a complicated apparatus for testing drugs which are standardized by their action on the isolated uterus muscle such as ergot and pituitary extracts.

Pittenger and Mulford, Jr., "The Deterioration of U. S. P. and Fat-Free Tinctures of Digitalis," JOURNAL A. PH. A., 1918, 7, p. 236.

The authors give details of results obtained from testing samples of digitalis tinctures prepared by different menstrua and aged for about 7 months. These show a remarkably high

rate of deterioration, in one case a loss in 7 months of about 70 percent. Their results seem to show that a fat-free tincture prepared with 50 percent alcohol deteriorates the least.

Pilcher, "The Bio-Assay of Veratrum Viride," *Amer. Journ. of Physicians*, 1917, 44, p. 1.

The author proposes the use of frogs for assaying veratrum preparations.

Robinson and Wilson, "A Quantitative Study of the Effect of Digitalis on the Heart of the Cat," *Journ. of Exp. Pharm. and Path.*, 1918, 10, p. 491.

The authors used the Cat Method of Assay and studied the action of digitalis on the heart. Among other facts developed is this—that the M. L. D. varied 100 percent, which coincides with results by some other authors.

Rogoff, "A Method for the Standardization of Thyroid Preparations," *Journ. of Pharm. and Exp. Therap.*, 1917, 10, 199.

The author suggests the action of thyroid material as a means of standardization. The effect is on the differentiation and growth, the more active the product the slower is growth and development.

Redonnet, "The So-called Titration of the Digitalis Preparations on Frogs," *Cor.-Bl. of Schweiz. Aertze*, 1917, 47, p. 974.

Roth, "The Activity of Wild American Digitalis," *Pub. Health Reports*, 1917, 32, p. 377.

Examination of digitalis from Oregon showed a high degree of toxicity compared with that commonly found on the market.

Salant, "The Pharmacology of the Oil of Chenopodium with Suggestions for the Prevention and Treatment of Poisoning," *Journ. Amer. Med. Ass'n*, 1917, 69, p. 2016.

The author determined the M. L. D. for a number of animals, showing by some experiments the action on circulation and respiration as well as on the digestive organs and the kidneys. He also demonstrated the value of a fatty oil such as olive, cocoanut or castor to minimize these effects.

Sellards and McIver, "The Treatment of Ameobic Dysentery with *Chaparro Amargosa*," *Journ. of Pharm. and Exp. Therap.*, 1918, 11, p. 331.

These authors found an active constituent in *Chaparro Amargosa*, testing it not only for chemical and toxic properties but also for its action on the parasite of moebic dysentery.

Sollmann, "The Comparative Activity of Local Anesthetics," *Journ. of Pharm. and Exp. Therap.*, 1917, Nov.; 1918, Feb.

Five series of tests were carried out in comparing the action with other local anesthetics. By different methods, different ratios were obtained, showing that their action is not identical and that no one method will show the efficiency of an anesthetic. The tests were carried out on the motor and sensory nerves (isolated) of frogs, on frog's skin, on the cornea and intracutaneously on human subjects.

Spaeth and Barbour, "The Action of Epinephrin and Ergotoxin upon Single Physiologically Isolated Cells," *Journ. Pharm. and Exp. Therap.*, 1917, 9, p. 431.

Using the melanophores of *Fundulus heteroclitis*, this author demonstrated its value in standardizing adrenalin (epinephrin), the pigment cells contracting with a dilution of 1 : 50,000,000. Ergotoxin expands the pigment cells and thus demonstrates the equivalence between these and other smooth muscle cells.

Apaeth, "A New Method for the Standardization of Pituitary Extract," *Journ. Pharm. and Exp. Therap.*, 1918, 11, p. 209.

The method just described was applied to the standardization of pituitrin solutions. The action is a contraction apparently identical with that observed with dilutions of adrenalin. The test is proposed as a method for quantitative assay of pituitary extracts. No results are appended.

REPORT OF THE DELEGATES OF THE A. PH. A. TO THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.*

As one of your delegates to the Annual Meeting of the National Wholesale Druggists' Association in Chicago last fall, I am pleased to report a cordial reception and disposition to cooperate in legislative matters. Mr. George W. Lattimer, of Columbus, Ohio, before reading his

* Presented at the Chicago meeting, A. Ph. A.

creditable and very valuable report of their Legislative Committee, expressed his joy in the selection of men to represent them in Washington who could be depended upon for correct information before Bureaus or Committees of Congress, backed by letters from members of their Committee resident at the principal State capitols.

This report will be of great interest to the legislative committees of this and other druggist associations, as it gives intelligent consideration to War Revenue Legislation, Bone-Dry Legislation, Harrison Narcotic Law, Testing of Imported Drugs, Drug Patents, Mailability of Poisons, Federal Child Labor Law, recently held as unconstitutional, Honest Paint Legislation, as indicated by bill introduced by Senator Kenyon of Iowa, Price Maintenance and the Stephens Bill, and other honest merchandising measures and statistics relating to the drug business in the various States.

Upon the conclusion of this report President Morrison recognized Mr. W. L. Crounse, their legislative correspondent, who had just arrived from Washington, in reference to the War Revenue Law to go into effect on that day (Oct. 3, 1917). Following his general remarks, we quote from page 399 of the printed Proceedings:

"President Morrison: The report of the Committee on Legislation is now open for general discussion.

"George H. Schafer: Mr. President and Gentlemen: I was one of the pioneer members of the Western Wholesale Druggists' Association; was on the Committee on Legislation when Mr. McKinley was chairman of the Ways and Means Committee.

"I today arise as a delegate of the American Pharmaceutical Association to commend the report just read and to briefly refer to our meeting at Louisville in 1874 (Proceedings, pages 545–550), when I proposed resolutions to petition Congress to remove the Liquor Dealers' License libel and other legislative evils that were hampering our profession and with increased membership ask Congress to abate such evils by pharmacists' license regulations to make a distinction between alcohol as sold by liquor dealers and alcohol used by the pharmacist. The idea was to make title distinction fundamental to tax exemption of alcohol for all legitimate uses of the licensed pharmacist and have the tax apply only to distilled spirits used for beverage purposes.

"In 1874 the Association felt they were not prepared to ask Congress for a differentiation as between the liquor dealer and the druggist, but such legislation is progressing, and through the instrumentality of the State pharmacy laws we are advancing to where this Association, the most influential of all, followed by the American Pharmaceutical Association, the National Association of Retail Druggists, and others, should endeavor to make a concerted effort to have these fundamentals adjusted and have a differentiation made between retail liquor dealers and registered pharmacists in the use of alcohol, especially so, when the Internal Revenue Law, just enacted, makes a partial but positive distinction as to distilled spirits not intended for beverage purposes.

"I will be glad to assist your Board of Control to perfect plans for the federation of all drug fraternities to unitedly petition Congress to now perfect such legislation as will exempt the Registered Pharmacist who complies with proper regulations from hanging up a liquor dealers' license or paying exorbitant taxes that should apply only to sales as a beverage."

Thereupon general discussion took place and many questions propounded, to which Mr. Crounse gave ready response and Secretary Holliday, preceding a suspension of this discussion, said:

"This information is very valuable, but there are many points which can not be covered in a discussion of this character, and I want to say that just as soon as I return home from this convention I will go to Washington and Mr. Crounse and myself will work out all of these details to the best of our ability and secure all the information we can from the Internal Revenue Bureau, and we will then send out a bulletin covering every item, and do it as soon as possible."

It pays to have known personal representatives at seats of government to issue bulletins or reply to important correspondence relating to the drug trade, and all druggists' associations should make coöperative arrangements to support same.

Respectfully submitted,

GEO. H. SCHAFER,

Attested by C. P. VAN SCHAACK.

H. M. WHELPLEY.

COUNCIL BUSINESS

COUNCIL MEETINGS.

SIXTH SESSION OF THE COUNCIL, 1917–1918.

(*Concluded from p. 912, October issue.*)

The following communication from the Section on Education and Legislation was presented:

> "The Section on Education and Legislation recommends to the Council that a committee be appointed to study the question of the separation of drug stores into two classes—drug stores and prescription pharmacies and present to us at our next annual meeting a plan of separation that will cause the least amount of harm and the greatest amount of good to both."

In this connection, the following statement was appended by Chairman F. H. Freericks of the Section:

> "I firmly believe that this separation is the only satisfactory solution to the problem and that the time is ripe for both parties to take the case to court and sue for divorce. No organization is better fitted to judge the case than the American Pharmaceutical Association; therefore, in conclusion, I would suggest that this Section recommend to the Council that a committee be appointed to study this question for a year and present to us at our next annual meeting a plan of separation that will cause the least amount of harm and the greatest amount of good to both members of the unhappy union."

On motion of Dr. F. E. Stewart, seconded by E. G. Eberle, the recommendation was adopted and the committee directed to be appointed by the Chairman of the Council.

Several matters referred by the Association to the Council were considered as follows:

(1) Appropriation of $25 to Committee on Syllabus.

On motion of Jacob Diner, seconded by H. V. Arny, the appropriation was granted.

(2) Appropriation of $10 for dues in American Metric Association.

On motion of H. V. Arny, seconded by W. B. Day, the appropriation was granted.

(3) Appropriation of $150 for Joint Committee on Revised Nomenclature of Cultivated Plants.

On motion of H. V. Arny, seconded by Jacob Diner, the appropriation was referred to the Committee on Finance to report on later to the Council.

The question of cost of reprints of the Report of the Committee on Military Status of Pharmacists in the Government Service, ordered to be published by the second general session of the Association, was considered, and on motion of J. A. Koch, seconded by H. V. Arny, it was directed to be charged against the Miscellaneous Items of the Budget of Appropriations.

Treasurer Whelpley discussed at length the desirability of converting certain funds of the Association into registered bonds of the Third Liberty Loan.

On motion of S. L. Hilton, seconded by Jacob Diner, the Treasurer was authorized to invest all or a part of the funds of the Life Membership Fund, the Centennial Fund and the Endowment Fund, amounting to $16,000 (now deposited in the Boston Penny Savings Bank) into registered bonds of the Third Liberty Loan.

On motion of J. A. Koch, seconded by H. V. Arny, it was decided to invest the funds of the William Procter, Jr., Memorial Fund in the same manner. The fund amounts to over $8,000.

Chairman Hopp announced the appointment of the Committee on Nominations for Committees of the Council to report at the first session of the Council for 1918–19, to be held on Saturday, August 17, 1918. The committee named was W. B. Day and J. W. England.

The recommendations of the address of Chairman F. H. Freericks, to the Section on Education and Legislation, and referred for action to the Council, were considered. These were as follows:

> "What can American Pharmacy do to secure the future of the young pharmacist now in the Army and Navy? Let us be mindful of the fact that while most of them will return strong in body and mind, there will be some unfortunately crippled

and more or less disabled for life. We must have a place not only for every one that returns sound in body, but also for all who are more or less disabled. Fortunately, the trained pharmacist, though he be blind or without limb, can with proper help continue a useful man in pharmacy, to the end of his day. My subject might be elaborated upon in many different ways, and with much detail, but it occurs to me to be a needless loss of words, if I may have the privilege to submit a rough outline of what, in my judgment, should now be done by American Pharmacy and particularly by the American Pharmaceutical Association.

"1st. I would propose the appointment of an A. Ph. A. Advisory Committee for Soldier and Sailor Pharmacists.

"2nd. With the aid of Pharmaceutical Journals and business houses who come in touch with retail pharmacists, it should be the duty of such Committee to learn the name and address of every pharmacist now in the service.

"3rd. Through the same medium it should be the duty of such Committee to learn and card index every pharmacist who now reasonably anticipates that he will have a position open for a pharmacist returning from the War.

"4th. By the same means it should be the duty of said Committee to learn of all now conducting retail drug stores who anticipate that they will be ready to dispose of them to one of the returning pharmacists after the War, or who may have favorable partnership openings to offer at that time.

"5th. A complete directory should be secured of all pharmacists who believe that they will have some useful opening for those of the men who will return partly disabled.

"6th. The Committee should adopt proper means, in ample time, to inform every pharmacist serving in the Army and Navy of its work, and of readiness to be of service in their re-establishment.

"7th. Anticipating that the man now a registered pharmacist of California, may, on his return, find employment in New York, and that the man now a registered pharmacist in New York, may find employment in Illinois, it should be made possible under the direction of the National Association of Boards of Pharmacy, and where their authority does not reach, then by an amendment of the respective state laws, that every pharmacist returning from the service, registered in one state, desiring to locate within another, shall, within six months after honorable discharge, have the absolute right, on the strength of registration in his home state, to become registered in such other state.

"I most earnestly urge that the American Pharmaceutical Association can not and should not fail in this high duty. This brief outline of how the matter may be handled is, of course, only a suggestion, and doubtless the general outline can and will be greatly improved. Just another thought. A wonderful opportunity is presented to our colleges and schools of pharmacy. Among the thousands of young pharmacists there will be thousands who have had no college training, and who with a college training would add glory to American Pharmacy. These men as they return, without any definite vocational ties, will be situated as otherwise they never could be, to give at least a year of their time to college training. Doubtless they will need assistance in one form or another, but where there is a will this can be readily provided. Are our colleges and schools of pharmacy awake to the situation? Is it impossible to arrange a special course for these men and is it altogether out of the question to overlook the pre-requisites, if necessary, where the service has been of such special nature?

"American Pharmacy not only has a duty, but has an opportunity which it would be a pity to neglect."

The general principles of the above recommendations were approved and the details of carrying them into effect were, on motion, referred to a special committee to be appointed by the Chairman of the Council.

The communication from the Commercial Section, presented at the fifth session of the Council, on August 15, 1918, the consideration of which was deferred, was then taken up and discussed.

On motion of H. V. Arny, seconded by Jacob Diner, the recommendations were approved and referred favorably to the National Drug Trade Conference for consideration and action.

Adjourned *sine die*.

J. W. ENGLAND, *Secretary*.

FIRST SESSION OF THE COUNCIL, 1918–1919.

The first session of the Council for 1918–19 was held at the Congress Hotel, Chicago, on Saturday, August 17, 1918, at 9.30 A.M., Chairman Hopp presiding.

Present: Messrs. H. V. Arny, T J. Bradley, Jacob Diner, Dr. A. R. L. Dohme, E. F. Kelly, J. W. England, J. G. Godding, S. L. Hilton, L. C. Hopp, Jeannot Hostmann, L. A. Seltzer, Dr. F. E. Stewart, F. J. Wulling, Charles E. Caspari, C. H. LaWall and E. G. Eberle.

The following application for membership was received and favorably acted upon:

No. 410. Albert Henry Fernhard, Assistant Surgeon, U. S. Navy, Headquarters 6th Regiment, Great Lakes, Ill., rec. by H. M. Whelpley and W. F. Rudd.

The election of officers of the Council for 1918–19 was held, the following being elected:

Chairman—Lewis C. Hopp.
Vice-Chairman—Samuel L. Hilton.
Secretary—J. W. England.

The election of officers of the Association for 1918–19 was held, the following being elected:

General Secretary—William B. Day.
Treasurer—Henry M. Whelpley.
Editor of the JOURNAL—Eugene G. Eberle.
Reporter on the Progress of Pharmacy—H. V. Arny.
Local Secretary—Hugo H. Schaefer.

The report of the Committee on Nominations on Committees of Council for 1918–19 was presented, and on motion of Dr. A. R. L. Dohme, seconded by S. L. Hilton, was adopted. The committees of the Council are:

COMMITTEES OF THE COUNCIL.

Committee on Finance and Auditing Committee.

J. A. Koch, Chairman, Pittsburgh, Pa. Otto F. Claus, St. Louis, Mo.
G. M. Beringer, Camden, N. J.

Committee on Publication.

J. W. England, Chairman, Philadelphia, Pa. C. A. Mayo, New York, N. Y.
George M. Beringer, Camden, N. J. H. B. Mason, Detroit, Mich.
E. L. Newcomb, Minneapolis, Minn.
Ex-Officio Members—The Editor, Reporter on the Progress of Pharmacy, General Secretary and Treasurer.

Committee on Invested and Trust Funds.

Wm. B. Day, Chairman, Chicago, Ill. Frederick J. Wulling, Minneapolis, Minn.
E. G. Eberle, Philadelphia, Pa. H. M. Whelpley, ex-officio, St. Louis, Mo.

Committee on Centennial Fund.

A. R. L. Dohme, Chairman, Baltimore, Md. Wm. B. Day, Chicago, Ill.
J. A. Koch, Pittsburgh, Pa.

Committee on Transportation.

Caswell A. Mayo, Chairman, New York, N. Y. J. L. Lengfeld, San Francisco, Cal.
Wm. B. Day, Chicago, Ill. E. Floyd Allen, Minneapolis, Minn.
Lewis C. Hopp, Cleveland, Ohio. F. C. Godbold, New Orleans, La.
H. M. Whelpley, St. Louis, Mo. W. S. Elkins, Jr., Atlanta, Ga.
Charles G. Merrell, Cincinnati, O. C. Herbert Packard, E. Boston, Mass.
E. F. Kelly, Baltimore, Md. Chas. J. Clayton, Denver, Colo.

The General Secretary and Local Secretary, ex-officio members.

Committee on National Formulary.

W. L. Scoville, Vice-Chairman, Detroit, Mich.
Clyde M. Snow, Chicago, Ill.
A. B. Stevens, Ann Arbor, Mich.
Otto Raubenheimer, Brooklyn, N. Y.
Leonard A. Seltzer, Detroit, Mich.
Harry V. Arny, New York, N. Y.
E. Fullerton Cook, Philadelphia, Pa.
H. A. B. Dunning, Baltimore, Md.
Samuel L. Hilton, Washington, D. C.
Charles H. LaWall, Philadelphia, Pa.
Geo. M. Beringer, Camden, N. J.
Wm. A. Hall, Detroit, Mich.
Adam Wirth, New Orleans, La.

Committee on Standards.

Elmer E. Wyckoff, Brooklyn, N. Y. ..... Term expires 1919
J. A. Koch, Chairman, Pittsburgh, Pa ..... Term expires 1919
L. D. Havenhill, Lawrence, Kans ..... Term expires 1919
E. L. Newcomb, Minneapolis, Minn ..... Term expires 1919
Henry Kraemer, Ann Arbor, Mich ..... Term expires 1920
Eustace H. Gane, New York City ..... Term expires 1920
B. L. Murray, Rahway, N. J ..... Term expires 1920
W. A. Puckner, Chicago, Ill ..... Term expires 1920
John G. Roberts, Philadelphia, Pa ..... Term expires 1921
Otto Raubenheimer, Brooklyn, N. Y ..... Term expires 1921
George D. Rosengarten, Philadelphia, Pa ..... Term expires 1921
O. A. Farwell, Detroit, Mich ..... Term expires 1921
George M. Beringer, Camden, N. J ..... Term expires 1922
H. H. Rusby, Newark, N. J ..... Term expires 1922
F. R. Eldred, Indianapolis, Ind ..... Term expires 1922
John M. Francis, Detroit, Mich ..... Term expires 1922

Committee on Recipe Book.

Theo. D. Wetterstroem, Cincinnati, Ohio ..... Term expires 1919
P. Henry Utech, Meadville, Pa ..... Term expires 1919
Wm. L. Cliffe, Philadelphia, Pa ..... Term expires 1919
Otto Raubenheimer, Chairman, Brooklyn, N. Y ..... Term expires 1920
C. H. LaWall, Philadelphia, Pa ..... Term expires 1920
W. L. Scoville, Detroit, Mich ..... Term expires 1921
W. H. Glover, Lawrence, Mass ..... Term expires 1921
Curt P. Wimmer, New York, N. Y ..... Term expires 1921
John K. Thum, Philadelphia, Pa ..... Term expires 1922
I. A. Becker, Chicago, Ill ..... Term expires 1922
Clarissa M. Roehr, San Francisco, Cal ..... Term expires 1922
Clarence G. Spalding, New Haven, Conn ..... Term expires 1923
E. Fullerton Cook, Philadelphia, Pa ..... Term expires 1923
William Gray, Chicago, Ill ..... Term expires 1923

Commission on Proprietary Medicine.

S. C. Henry, Philadelphia, Pa ..... Term expires 1919
J. H. Beal, Chairman, Urbana, Ill ..... Term expires 1920
W. H. Cousins, Dallas, Tex ..... Term expires 1921
John C. Wallace, New Castle, Pa ..... Term expires 1922
Charles E. Caspari, St. Louis, Mo ..... Term expires 1923

Treasurer Whelpley discussed the question of delinquency of dues by members, and on motion of W. B. Day, seconded by T. J. Bradley, the Treasurer was authorized to use his discretion in continuing the delinquents of 1918 as members, but in no case beyond the end of the present fiscal year.

Jeannot Hostmann stated that the House of Delegates had approved of the suggestion of "combination dues" for members of the A. Ph. A. and the State Pharmaceutical Associations, referred to it by the Council, and had instructed the delegates present from the State Associations to present the matter to the Associations for consideration at their next annual meeting.

Adjourned.

J. W. ENGLAND, *Secretary.*

A. PH. A. COUNCIL LETTER NO. 1.

PHILADELPHIA, September 4, 1918.

TO THE MEMBERS OF THE COUNCIL:

The following is a list of the members of the Council for 1918–1919:

MEMBERS OF THE COUNCIL 1918–19.

Arny, H. V., 115 W. 68th Street, New York, N. Y.
Beal, James H., 801 W. Nevada Street, Urbana, Ill.
Beringer, George M., 5th and Federal Streets, Camden, N. J.
Bradley, Theo. J., Mass. College of Pharmacy, Boston, Mass.
Caspari, Charles E., 2108 Locust Street, St. Louis, Mo.
Cook, E. Fullerton, 145 North 10th Street, Philadelphia, Pa.
Day, Wm. B., 701 South Wood Street, Chicago, Ill.
Dohme, Alfred R. L., Pratt and Howard Streets, Baltimore, Md.
Dye, Clair A., Ohio State Univ., Columbus, Ohio.
Eberle, Eugene G., 253 Bourse Building, Philadelphia, Pa.
Eldred, Frank R., 3325 Kenwood Avenue, Indianapolis, Ind.
England, Joseph W., 415 N. 33rd Street, Philadelphia, Pa.
Fennel, C. T. P., 614 W. Court Street, Cincinnati, Ohio.
Fuller, Oliver F., 540 W. Randolph Street, Chicago, Ill.
Fuller, H. C., 19th and B Streets, N. W., Washington, D. C.
Gathercoal, E. N., 701 South Wood Street, Chicago, Ill.
Godding, John G., 278 Dartmouth Street, Boston, Mass.
Hemm, Francis, 2108 Locust Street, St. Louis, Mo.
Hensel, Samuel T., 351 Mercantile Building, Denver, Colo.
Hilton, Samuel L., 1033 22nd Street, N. W., Washington, D. C.
Hopp, Lewis C., 1104 Euclid Avenue, Cleveland, Ohio.
Hostmann, Jeannot, 115 W. 68th Street, New York, N. Y.
Kantrowitz, Hugo, 600 W. 178th Street, New York, N. Y.
Kelly, E. F., Lombard and Green Streets, Baltimore, Md.
Koch, J. A., Bluff and Pride Streets, Pittsburgh, Pa.
LaPierre, E. H., 80 River Street, Cambridge, Mass.
LaWall, C. H., 39 South 10th Street, Philadelphia, Pa.
Mason, Harry B., P. O. Box 484, Detroit, Mich.
Mayo, Caswell A., 66 West Broadway, New York, N. Y.
Nitardy, F. W., 66 Orange Street, Brooklyn, N. Y.
Roehr, Clarissa M., University Hospital, San Francisco, Cal.
Schaefer, Hugo H., 115 West 68th Street, New York, N. Y.
Seltzer, L. A., 32 Adams Street, W., Detroit, Mich.
Snow, Clyde M., 701 South Wood Street, Chicago, Ill.
Stewart, Francis E., 11 W. Phil-Ellena Street, Philadelphia, Pa.
Terry, R. W., Groveport, Ohio.
Whelpley, Henry M., 2342 Albion Place, St. Louis, Mo.
White, William R., 314 Hancock Street, Nashville, Tenn.
Wilkerson, J. A., 4th and Washington Streets, St. Louis, Mo.
Wulling, F. J., University of Minnesota, Minneapolis, Minn.
Rudd, Wortley F., 1716 Grove Avenue, Richmond, Va.
Total number, 41.

The Committees of the Council elected for 1918–1919 are printed under First Session of the Council for 1918–1919 on pp. 1006 and 1007 of this issue.

J. W. ENGLAND, *Secretary.*

415 N. 33rd Street.

A. PH. A. COUNCIL LETTER NO. 2.

PHILADELPHIA, PA., September 23, 1918.

TO THE MEMBERS OF THE COUNCIL:

The following communication has been received:

"TO THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

GENTLEMEN:

"At the Chicago meeting the Council referred to the Committee on Finance the question of increasing the salaries of the officers of the Association on account of the rising cost of clerical and other work.

"The Committee has very carefully considered the present income and fixed charges of the association and arrived at the conclusion that it would be extremely unwise to increase these fixed charges at the present time. In view, however, of the urgency of the request of the Treasurer for aid at the present time to meet the increased cost of operation of his office, the Committee feels that some action for the relief of the Treasurer should be taken and recommends that an emergency appropriation of two hundred and fifty dollars ($250.00) be made to meet the increased clerical expenses of the Treasurer's office during the year commencing August 15, 1918.

"The Committee desires it to be clearly understood that this is not an increase of salary, but only an appropriation made to enable the Treasurer to meet the increased cost of clerical aid in his work caused by the war conditions.

"With respect to the recommendation of the Committee on Publication that the salary of the Editor be increased two hundred and fifty dollars ($250.00) per annum, the Committee recommends that this be granted because of the increased cost of living and the fact that the position is one requiring all of the time of the incumbent.

Respectfully submitted,

J. A. KOCH, *Chairman*,
GEORGE M. BERINGER,
OTTO F. CLAUS,
Committee on Finance."

What is the wish of the Council?

General Secretary Day offers the following resolutions. They have been suggested by Dr. C. C. Pierce, Assistant Surgeon General, Division of Venereal Diseases, Bureau of Public Health Service.

"WHEREAS, It is a matter of medical record that venereal diseases are the greatest single cause of disability in the Army; and

"WHEREAS, It has been demonstrated that the great majority of such diseases are brought into the Army from civilian life, having been contracted before enlistment; and

"WHEREAS, It has been demonstrated that one of the greatest contributing factors to the continued existence and spread of venereal infection among the civilian population is attempted self-treatment by individuals without proper medical diagnosis and direction.

"*Therefore be it resolved*, That the Council of the American Pharmaceutical Association, appreciating the seriousness of venereal diseases among the armed forces of the United States, and desirous of doing everything in its power to assist the Government in the war emergency, pledges the best efforts of the organization in coöperating with the program of the United States Public Health Service to reduce the venereal disease scourge.

"*And be it further resolved*, That this Association recommends to the retail druggists of the United States that they discourage attempted self-treatment by refusing to sell to infected people who are carriers of venereal disease, patent proprietary remedies compounded for such self-treatment, and by directing such carriers to competent physicians, venereal clinics or boards of health for scientific care, so as to hasten their cure and reduce the danger of infection to civilians and to soldiers and sailors of the United States."

(*To be concluded in December issue.*)

EDITORIAL NOTES

Editor: E. G. EBERLE, Bourse Building, Philadelphia, Pa.
Committee on Publication: J. W. ENGLAND, *Chairman;* G. M. BERINGER, CASWELL A. MAYO, H. B. MASON, E. L. NEWCOMB, and the Editor-in-Chief of the JOURNAL, General Secretary, Treasurer and Reporter on the Progress of Pharmacy, *ex-officio.*
Editorial Office: 253 Bourse Building, Philadelphia, Pa.

SERUMS AND VACCINES IN INFLUENZA.

In an editorial of the *Journal A. M. A.*, November 2, 1918, it is stated that up to the present time there is no specific means for the cure of influenza, and no specific vaccine or vaccines for its prevention.

TOXICITY OF CERTAIN ORGANIC ARSENIC COMPOUNDS AND TOXICITY OF EMETINE HYDROCHLORIDE.

Bulletin No. 113 of the Hygienic Laboratory, U. S. Public Health Service, reports on experimental investigations of the toxicity of certain organic arsenic compounds by George B. Roth, and on the toxicity of emetine hydrochloride, with special reference to the comparative toxicity of various market preparations by Gleason C. Lake.

The first part of the first report deals with Salvarsan made in America and the second with Neosalvarsan and Neodiarsenol and cover forty pages.

The general conclusions of the reporter are (1) that no marked variation in toxicity was found in either German or American salvarsan, as shown by intravenous administration to rabbits and rats.

2. Individual variation in susceptibility to salvarsan is quite marked in both rabbits and rats.

3. The toxicity for rabbits and rats closely parallels the arsenic content of the salvarsan preparations examined.

4. Neosalvarsan preparations were found to be less toxic for rabbits and rats than the salvarsan preparations examined.

The author states that the work reported is to be followed by a more detailed examination of a larger number of samples and a consideration of some of the questions developed are now being made subjects of experimental study.

Gleason C. Lake acknowledges indebtedness to Dr. Carl Voegtlin, of the Hygienic Laboratory for many valuable suggestions and criticisms.

The results indicate a widely variable individual susceptibility with the same preparation of emetine hydrochloride in rabbits, white rats and white mice. The author states that Rowntree and Levy's work shows that the same holds true in cats and dogs, and concludes that the range of susceptibility to emetine poisoning varies in man, and perhaps more so, in so far as it has to do with cases of amoebic dysentery, where there is always present a pathological condition, varying in intensity.

ACUTE POISONING FROM 5 GRAINS OF ASPIRIN.

Dr. Edmund P. Shelby, New York City Hospital, reports on a case of poisoning from the administration of five grains of aspirin. The subject was a strong, vigorous woman. The toxic effects followed in less than an hour after taking the medicine and persisted for several hours. The report states that unusual susceptibility to the action of salicylates has often been noted, but no case is recalled wherein so small a dose produced such marked symptoms.

INDIANA STATE MEDICAL JOURNAL COMMENTS ON THE EDMONDS BILL.

While the editorial of the October issue *Indiana State Medical Journal* indorses the Edmonds Bill, a fear is expressed that, unless proper provisions are made, "unscrupulous manufacturers will foist their wares upon the Army." Also the following lines occur in the editorial: "It is nothing short of a disgrace to note that at the present time a few worthless proprietaries, through the influence of mercenary manufacturers' have been accepted and included as part of the medical supplies of the Army."

The latter can only indicate that the medical men of the Army have permitted these preparations to be included, and the first quotation shows where the trouble is, namely, lack of confidence in the sincerity of pharmacists. It is the old story. Pharmacists and physicians should know each other better and work to-

gether for the uplift of pharmacy, for the benefit of mankind. Carping criticism and lack of confidence will never do it.

The Edmonds Bill provides for pharmacists, as such; the fact that drug stores handle "patent medicines" has nothing whatever to do with them. Though they be pharmacists they are also men.

REQUIREMENTS FOR S. A. T. C. LOWERED.

Requirements for entrance into the Student Army Training Corps at U. of P. have been reduced by an order of the War Department issued through the Committee of Education and Special Training. Inductions under previous orders were limited to men who presented sufficient college entrance credits and who applied for admittance before October 30.

Now all men desiring to attend any of the student army training colleges may do so, regardless of the fact that they have not quite enough preparatory work to meet the college entrance requirements, providing they have had vocational, military or business experience which in the estimation of the commanding officials will qualify them as officer material.

PHARMACISTS COMMENDED FOR GALLANT CONDUCT IN BATTLE.

Secretary Daniels, of the Navy, has commended seven pharmacists and two hospital apprentices now on service with the Sixth Regiment of Marines, A. E. F., for gallant conduct under fire in battle. Those cited are:

Oscar S. Goodwin, North Carolina; Percy V. Templeton, Georgia; Emmett Cline Smith, Georgia; Edmund P. Groh, Iowa; Leveque L. Whalen, Washington; Ursher Lee Fifer, Virginia; Horatio D. Gates, North Dakota; John Humphrey Marks, Oklahoma; Clyde A. Kindle, California; Bernard W. Herrmann, Jr., Ohio.

THE NEED OF PUBLICITY FOR PHARMACY.

British Pharmacists are planning a general campaign of education to inform the Government departments and the public generally, relative to pharmacy. In an article on the subject in the *Chemist and Druggist* anent the propaganda use is made of a quotation from an address by an ex-President of the A. Ph. A., Dr. Oscar Oldberg, in 1911, when he said:

> "I venture to call upon all pharmacists present to begin here and now a vigorous campaign to compel full recognition of the great service rendered to mankind by the pharmacist. The public is ignorant of the fact that the pharmacist is the sole agent to whom must be entrusted the enforcement of so much of the public health laws as relates to the drugs used in the practice of medicine. Let us try to remove that ignorance. It is our right and duty to demand respect for the service rendered by our craft."

We have just as much need of this kind of publicity for pharmacy as they have in Great Britain. There unwarranted charges of profiteering have been made, which will be answered. Here we frequently have aspersions cast upon pharmacy and pharmacists that should be refuted. The public has not the proper conception of pharmacy nor is a very great interest displayed for it; if it had been otherwise, a pharmaceutical corps would have been part of the Medical Department of the Army before now. A good Republican once said, "I have watched ——— and I have never discovered him in any wrongdoing, and he is a Democrat!" There are medical men so possessed of self-righteousness that they think none of their profession can do wrong, and every pharmacist is to be distrusted. Let us get closer; we should know each other, we have the same interests and purposes in common. Surely the liberal-minded men know that pharmacists are sincere in their desire for betterment, and they also know that disinterestedness is not universal among medical men. It is an easy matter to "break down"—we prefer to "build up" and not only for the good of professions but for humanity.

Let the propaganda by local, State and National associations proceed with a purpose of education, to tell the truth, and impress the value of pharmacy. In each locality the work will be somewhat differently outlined, but the purpose should be to advance the drug business and the cause of pharmacy. The address of Chairman J. C. Peacock of the Section on Practical Pharmacy and Dispensing, A. Ph. A., is worthy of careful study.

THE CHINESE OPIUM SCANDAL.

The opium trade is one of the causes of the split between North and South China.

Production and importation of opium were forbidden in 1911, and the law came into full operation on April 1, 1917, when the opium syndicate found it had 1,576 chests of opium on hand. President Feng Kuo-Chang con-

tracted to buy this opium for the Chinese Government, which was to pay 8,200 taels per chest, but the syndicate was to get only 5,700 taels. The difference was to go into the pockets of the President of China and his associates.

It now appears that the Peking government afterwards made a new deal with the opium syndicate and resold the opium on hand to another syndicate in which some prominent Japanese have an interest. The old opium syndicate got about $10,000,000 for its stock of opium, and the President and members of the Peking government took as their share about $3,000,000 and a loan of $5,000,000 from the Japanese financiers.—From an editorial in *N. Y. Commercial*.

WAR PROFITS.

In a recent discussion on War Profits, Chas. J. Lynn, President of the American Drug Manufacturers' Association, furnished much food for thought when he said:

"War profits in my opinion are those which are the direct result of the war, such as those made by manufacturers who furnish directly or indirectly material of whatever kind used in the prosecution of the war, and only that portion of the profit made on such material is war profit. In the case of the average mercantile house, they will not know what their actual profits have been during the period of the war until after the war is over and they have passed through a readjustment period and are able to strike an average, and in my opinion the average thus found will in many cases be less than the normal average for the pre-war period.

"Many concerns have shown a considerable increase in profits as expressed in dollars and cents, due to increased business resulting from the general prosperity of the country without, however, having increased their normal percentage of profit even a small fraction. Other concerns not supplying materials for use in the prosecution of the war may thus far have shown an abnormal profit both in dollars and cents as well as in percentage due to the very large and rapid increase in the value of merchandise on hand. But this profit must later in practically every case be offset by the very large and rapid decline in stock values the moment peace is declared.

"I think that in determining just what is a war profit these conditions should be taken into consideration."

PAPER CONSERVATION.

November 11 to 16 was named as Paper Economy Display Week, and the Paper Economy Section of the War Industries Board asked that every retail merchant use a window display setting forth the necessity for paper economy and bringing to the attention of the public that all merchants are directed to discontinue the wrapping of package merchandise. This is a matter in which every druggist should be interested, from an economic standpoint. The Paper Economy Section suggested window displays during this week, and they are prepared to suggest slogans and other material which will help in the preparation of window cards. The Section is also desirous of securing photographs of good displays.

We heartily endorse every movement for economy in every possible direction. Unfortunately, however, there are many who disregard the necessity of economizing and all too frequently we see much waste of the very things that the conscientious citizen economizes in, thus, for example, it has been under advisement to construct a papier mache track for an international six-day bicycle race in New York. In this construction 48,000 square feet of material would be required. This is only one instance in which there is disregard of conservation. There is also much printed matter that consumes a great deal of paper and has really little general value. A movement is on foot to standardize the size of catalogues. This is a splendid move and will undoubtedly not only conserve paper but also make the filing of the catalogues more convenient. This proposition is discussed in the Proceedings of the Catalogue Conference held in Chicago May 22. The Proceedings are published by Poole Brothers, Chicago, from whom a copy of the report may be had.

ELIMINATE RETURNS OF MERCHANDISE.

The following request has been made by the War Industries Board:

"The Conservation Division of the War Industries Board has issued a special appeal to retailers, wholesalers and manufacturers in every industry and trade to coöperate with each other for the elimination of all unjustifiable returns of merchandise. This request is not intended to interfere with the return of merchandise when there has been an error on the part of the seller as to price, style, or quality, misinterpretation of order, unauthorized

substitution, or when merchandise is inferior or not up to sample. When goods are delivered as bought, however, they should not be returned to the seller. If merchandise is to be returned because of substitution or error of any kind, notice should be given by the purchaser within ten days after the receipt of the goods that return is intended.

"Ample time should, of course, be allowed for explanation or proffered adjustment. Salesmen should make definite sales only. In their travels, furthermore, they can be of particular assistance by enlisting the coöperation of their customers for careful selection and purchase of merchandise so that returns will be unnecessary. Whole-hearted compliance with this request in the spirit of husbanding our resources and eliminating waste of transportation, materials and labor will be a substantial contribution by the merchants and manufacturers of the country to our general welfare and the success of the war program."

OBITUARY.

FREDERICK E. NIECE.

Frederick E. Niece, Superintendent of the Claremont Laboratories, New York City, died October 26 at his home in Queens Village, Long Island. Mr. Niece contracted influenza while experimenting to obtain a preventative serum for this disease. He was also preparing a lecture on the subject, to be delivered at the Cooper Union some time during this month. Mr. Niece was 43 years old, a native of Scranton, Pa., and held degrees from Cooper Union and the Brooklyn College of Pharmacy. He was a frequent contributor to various Sections of the American Pharmaceutical Association. He joined the American Pharmaceutical Association in 1903.

THOMAS LATHAM.

Thomas Latham, a prominent pharmacist of New York City, died September 24. Mr. Latham had been in poor health for several years, on which account he sold his drug store at Third Ave. and Seventy-fifth Street some time ago. Mr. Latham had established this store about thirty years ago, and previous to that time had been connected with Eimer and Amend. Mr. Latham was active in pharmaceutical organizations and was one of the founders of the Manhattan Association and also an officer. He was President during two years of the New York County Pharmaceutical Association, and an active member of the American Pharmaceutical Association, which he joined in 1900. The deceased is survived by a sister.

JESSE D. HODGES.

Jesse D. Hodges, of Little Rock, Arkansas, and President of the Arkansas Association of Pharmacists, died October 15, of influenza. Mr. Hodges joined the American Pharmaceutical Association in 1915.

GEORGE P. HEMM.

George P. Hemm, oldest son of Professor and Mrs. Francis Hemm, of St. Louis, died at his home in Hayes, Kansas, October 11. Dr. Hemm was a graduate of the St. Louis College of Pharmacy and of the St. Louis University Medical School.

ALBERT HENRY HEIDBREDER.

Albert Henry Heidbreder, of Quincy, Illinois, a graduate of the University of Illinois School of Pharmacy, Class of 1899, and a member of the firm of Heidbreder Bros. & Co., who operate several drug stores in Quincy, died at his home recently. He leaves a widow and a young son. He joined the American Pharmaceutical Association in 1905. W. B. D.

CARL WILLIAM LUTZ.

Carl William Lutz, a prominent business man of Ottawa, Ill., died October 20, 1918, of pneumonia after a brief illness. Mr. Lutz was born in Ottawa June 10, 1887, and educated in the public school and high school of his native city. In 1910 he graduated from the University of Illinois School of Pharmacy, and after spending one year in drug stores in Chicago he entered upon his course in medicine at the College of Medicine of the University of Illinois, from which he was graduated in 1915. Though licensed to practice medicine, he was called to pharmacy again by the death of his father, C. J. Lutz, in July 1915, and since that date he successfully managed the drug store that he inherited from his father in Ottawa. In 1917 Mr. Lutz was appointed a member of the Board of Pharmacy examiners by Governor Lowden and served up to the time of his demise. In 1915 he married Miss I. M. Berg, of Chicago, to whom one child was born, Carl Frederick, now three

months old. Mr. Lutz joined the American Pharmaceutical Association in 1917 and was in attendance at the Chicago meeting. He was very highly esteemed and was regarded as one of the successful business men of his community. W. B. D.

SOCIETIES AND COLLEGES.

NATIONAL COMMITTEE ON THE PHARMACEUTICAL SYLLABUS.

BULLETIN XIX.

To the Members of the National Committee on the Pharmaceutical Syllabus:

I hand you herewith the financial statement of the Committee:

Receipts.

1917.			
Oct.	4	T. J. Bradley, retiring Treasurer	$23.95
Oct.	25	American Pharmaceutical Association	25.00
Oct.	29	American Conference of Pharmaceutical Faculties	25.00
Nov.	5	National Assn. Boards of Pharmacy	25.00
		Sale of 3 copies of the Syllabus	3.85
			$102.80

Disbursements.

1917.			
Oct.	12	Freight from Boston and cartage	$ 2.80
Oct.	12	Typewriting for Bulletins XIII–XIV–XV	3.00
Oct.	29	Spatula Publishing Co., supplies	12.75
Nov.	2	100 3c. postage stamps	3.00
Dec.	7	T. J. Bradley, miscellaneous expense	9.00
			$30.55
1918.			
Aug.	6	Cash on hand	72.25
			$102.80

There are now in the hands of the Secretary-Treasurer about one hundred and ten copies of the Syllabus.

Respectfully,

CLYDE M. SNOW,
Secretary-Treasurer.

Examined and found correct, August 14, 1918.

GEO. C. DIEKMAN,
Auditing Committee.

CHICAGO, ILL.,
Aug. 6, 1918.

BULLETIN XX.

Minutes of the meeting of the Committee held at the Congress Hotel, Chicago, Illinois, August 14, 1918, Chairman T. J. Bradley presiding.

Present: Messrs. W. C. Anderson, T. J. Bradley, John Culley, G. C. Diekman, E. G. Eberle, W. G. Gregory, J. A. Koch, W. H. Rudder, H. H. Rusby, C. M. Snow.

The Chairman presented his report in which he discussed the following matters of interest to the Committee:

Revision of the introductory matter of the Syllabus.

Make the Syllabus a true syllabus and in no way a compend.

Definitions in the Syllabus.

Lists of text and reference books in the Syllabus.

Might a chapter on "Model Questions" in the Syllabus be of value to members of boards of pharmacy?

Should large and small type be used in the Syllabus to indicate required and elective parts of subjects?

Shall the definition of the word "pharmacology" be changed to conform to medical usage?

Moved by H. H. Rusby, seconded by J. A. Koch, that the sub-Committee reports on revision be sent to the Chairman who will submit them by mail to the several members. Carried.

Moved by W. G. Gregory, seconded by W. C. Anderson, that the introductory chapters of the Syllabus be revised by the Chairman. Carried.

Moved by J. A. Koch, seconded by John Culley, that a list of pharmaceutical terms with definitions be included in the Syllabus as a glossary. Carried.

Moved by W. G. Gregory, seconded by W. H. Rudder, that the Secretary make a list of terms to be defined and submit such list to all members of the Committee for suggestions and revision. Carried.

Moved by J. A. Koch, seconded by W. G. Gregory, that lists of text and reference books be eliminated from the Syllabus. Carried.

The question of including a chapter in the Syllabus on Model Questions was discussed at some length. It was the sense of the Committee that such a chapter should be included.

Moved by John Culley, seconded by G. C. Diekman, that the coöperation of officers of the Association of Boards of Pharmacy be invited in the preparation of the chapter on Model Questions. Carried.

Moved by W. G. Gregory, seconded by H. H. Rusby, that the major or required exercises of the Syllabus be printed in large type and the minor or optional exercises be printed in small type. Carried.

Moved by W. G. Gregory, seconded by H. H. Rusby, that the definition of the word "pharmacology" be continued as now given in the Syllabus. Carried.

The Secretary-Treasurer presented his report. It was moved and seconded that the report be received and that it be audited by G. C. Diekman. Carried. (This report is circulated as Bulletin XIX.)

The report of the sub-committee on Materia Medica was presented by H. H. Rusby. Dr. Rusby recommended that the study of botany should be divided into two groups, *viz.*, Gross Structure and Microscopical Structure. This recommendation was adopted.

The report of the sub-committee on Chemistry was presented by J. A. Koch.

The report of the sub-committee on Pharmacy was presented by W. H. Rudder.

Chairman Bradley presented the results of a study of the subjects included by various colleges in a graduate course of one year leading to the degree of Pharmaceutical Chemist after the customary two-year course. Catalogues of more than sixty colleges of pharmacy were examined and it was found that thirty-five offer such a graduate course. Several colleges which are departments of state universities send their students to other departments of the universities for very diverse subjects, some of which have little or no connection with pharmacy. The subjects included in the various courses were classed under the following four heads, the numbers being the number of schools offering such subjects, from a total of thirty-five schools:

Subjects in the department of Materia Medica: Bacteriology, 26; advanced microscopy and micro-analysis, 13; advanced pharmacognosy, 9; toxicology, 9; advanced pharmacology, 6; physiology, 6; hygiene, 3; physiological testing, 3; etc.

Subjects in the Department of Chemistry: Food and drug analysis, 21; pharmaceutical assaying, 20; quantitative analysis, 18; advanced organic chemistry, 17; chemical technology, 9; urinalysis, 9; physiological chemistry, 9; physics, 5; etc.

Subjects in the Department of Pharmacy: Manufacturing pharmacy, 10; dispensing, 10; commercial pharmacy, 6; etc.

Miscellaneous subjects: Modern languages, 8; electives from university courses, 5; mathematics, 3; English, 2; etc.

Moved by W. G. Gregory, seconded by J. A. Koch, that 750 hours be required as a minimum for the third year course. Carried.

Moved by G. C. Diekman, seconded by W. C. Anderson, that Bacteriology be a required subject in the third year course. Carried.

Moved by J. A. Koch, seconded by W. C. Anderson, that Advanced Analytical Chemistry be a required subject in the third year course. Carried.

Moved by W. C. Anderson, seconded by G. C. Diekman, that Advanced Manufacturing Pharmacy be a required subject in the third year course. Carried.

Moved by H. H. Rusby, seconded by W. G. Gregory, that 75 hours of Bacteriology be the minimum requirement for this subject in the third year course. Carried.

Moved by J. A. Koch, seconded by G. C. Diekman, that 300 hours be the minimum requirement in Advanced Analytical Chemistry in the third year course. Carried.

Moved by W. C. Anderson, seconded by G. C. Diekman, that 100 hours be the minimum requirement in Advanced Manufacturing Pharmacy in the third year course. Carried.

The matter of Elective Subjects was then discussed. It was the sense of the Committee that it might with propriety designate Elective Subjects in the various departments.

Moved by H. H. Rusby, seconded by W. G. Gregory, that Micro-Analysis, Advanced Botany, and Physiological Testing be Elective Subjects in the department of Materia Medica. Carried.

Moved by J. A. Koch, seconded by G. C. Diekman, that Advanced Organic Chemistry, Chemical Technology, and Urine Analysis be Elective Subjects in the department of Chemistry. Carried.

Moved by W. G. Gregory, seconded by W. H. Rudder, that Dispensing and Pharmaceutical Jurisprudence be Elective Subjects in the department of Pharmacy. Carried.

Moved by W. C. Anderson, seconded by G. C. Diekman, that the Committee adjourn subject to the call of the Chairman. Carried.

CLYDE M. SNOW,
Secretary-Treasurer.

BULLETIN XXI.

BOSTON, MASS., October 10, 1918.

The proposed revision of the section on Chemistry, as prepared by the sub-committee on that subject, has been sent to all members of the Committee, and the revisions of the sections on Pharmacy and Materia Medica will be sent out soon. All members of the Committee are asked to read these sections carefully as they are received, and to send suggestions and criticisms to the Chairman to be considered during the final revisions of the section, before they are published. The mimeographed sheets of the revised sections should be preserved for reference until revised sets are distributed.

The Committee now has the following membership:

FROM AMERICAN PHARMACEUTICAL ASSOCIATION.

Term expires.

1919 Edwin L. Newcomb, University of Minnesota School of Pharmacy, Minneapolis, Minn.

1920 Eugene G. Eberle, 253 Bourse Bldg., Philadelphia, Pa.

1921 Harry B. Mason, P. O. Box 484, Detroit, Mich.

1922 George M. Beringer, 501 Federal St., Camden, N. J.

1923 Henry H. Rusby, 115 West 68th St., New York, N. Y.

1924 Willis G. Gregory, 125 Bedford St., Buffalo, N. Y.

1925 William H. Rudder, Salem, Indiana.

FROM AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES.

1919 Clement B. Lowe, 145 North Tenth St., Philadelphia, Pa.

1920 William C. Anderson, 315 Greene Ave., Brooklyn, N. Y.

1921 Julius A. Koch, Bluff and Pride Sts., Pittsburgh, Pa.

1922 Theodore J. Bradley, 179 Longwood Ave., Boston, Mass.

1923 Clyde M. Snow, 701 South Wood St., Chicago, Ill.

1924 Albert Bolenbaugh, Richmond, Va.

1925 Edsel A Ruddiman, Vanderbilt University, Nashville, Tenn.

FROM NATIONAL ASSOCIATION OF BOARDS OF PHARMACY.

1919 George C. Diekman, 115 West 68th St., New York, N. Y.

1920 Mason C. Beebe, 75 Church St., Burlington, Vt.

1921 John Culley, 2479 Washington Ave., Ogden, Utah.

1922 Ellis E. Faulkner, Delton, Mich.

1923 Charles H. Skinner, Windsor, Vt.

1924 Otto W. Osterlund, 46th St. and Baltimore Ave., Philadelphia, Pa.

1925 George W. McDuff, 2712 Magazine St., New Orleans, La.

E. A. Ruddiman and G. W. McDuff are hereby appointed as members of the sub-committee on Chemistry to fill existing vacancies.

Corrected list of members of sub-committees:

MATERIA MEDICA.

H. H. Rusby, *Chairman.*
M. C. Beebe.
G. M. Beringer.
John Culley.
E. E. Faulkner.
C. B. Lowe.
E. L. Newcomb.

CHEMISTRY.

J. A. Koch, *Chairman.*
T. J. Bradley.
E. G. Eberle.
G. W. McDuff.
O. W. Osterlund.
E. A. Ruddiman.
C. H. Skinner.

PHARMACY.

W. H. Rudder, *Chairman.*
W. C. Anderson.
Albert Bolenbaugh.
G. C. Diekman.
W. G. Gregory.
H. B. Mason.
C. M. Snow.

(Signed) THEODORE J. BRADLEY.
Chairman.

THE PHARMACIST AND THE LAW.

U. S. P. LIMITATION REMOVED FROM T. D. 2,760.

Treasury Decision 2,760 revised, T. D. 2,576 and the paragraph which has now been amended read:

"Medicaments.—As the minimum dosage each liquid ounce of the completed preparation must carry in it approximately an average U. S. P. dose for an adult of some drug or drugs of recognized therapeutic value, either singly or in compatible combination."

"U. S. P." has been eliminated; without this modification it would have been unlawful to use any new drug which might be discovered in the manufacture of an alcoholic medicinal compound without the payment of the special tax, because such drug would not be U. S. P.

SACCHARIN STILL AN ADULTERANT.

Use of saccharin in foods still is regarded as an adulteration under the Food and Drugs Act by the Department of Agriculture. Requests for reversal, or at least reconsideration of an old ruling on this subject is denied by the department. It is held saccharin, as a substitute for sugar, reduces the food value, and persistent use of it is likely to impair digestion.

BECAUSE OF INFLUENZA PRESCRIPTIONS FOR NARCOTICS MAY BE REFILLED.

Because of the spread of the Spanish influenza epidemic and the difficulty in obtaining immediate medical attention, the collector of internal revenue of the New York port has received notice of the modification of the narcotic laws, whereby prescriptions containing morphine, codeine or heroine may be refilled. The notice follows:—

INTERNAL REVENUE.

Refilling Narcotic Prescriptions. Modifying Article II of Regulations No. 35.

To Collectors of Internal Revenue and Others Concerned:—

Owing to the extent of the epidemic of Spanish influenza now prevailing in this country and consequent difficulty of persons in getting immediate medical attention and medicaments upon prescriptions issued by physicians, the provisions of Article II of regulations are modified as follows:—

Prescriptions calling for morphine, codeine or heroine which are written by registered practitioners for patients suffering from Spanish influenza and any pulmonary or bronchial affections, may, until further notice, be refilled, provided that at the time of issuage by physicians instructions are noted in the body of such prescriptions, "Repeat if necessary," and the druggist filling and refilling the same shall note thereon each and every date upon which such prescription is refilled.

DANIEL C. ROPER,
Commissioner of Internal Revenue.

Approved October 22, 1918.

L. S. ROWE,
Acting Secretary of the Treasury.

COLGATE & CO. INDICTMENT DISMISSED.

Holding that the indictment failed to charge any offense, either in restraint of trade and commerce under the provisions of the Sherman Anti-Trust Law or under any other law of the United States, Judge Edmund Waddill, Jr., in the Federal District Court sustained the demurrer and quashed the indictment in the case of the United States against Colgate & Co., charging violations of the Sherman Anti-Trust Law.

A. Leo Everett, counsel for N. W. D. A., has commented on the decision as follows:—

"Colgate & Co. adopted the practice of selling its goods with the information to the purchaser as to the price at which they should be resold by him. The purchaser at the same time was informed that if he failed to maintain the price Colgate & Co. would refuse to have further dealings with him. While this practice did not involve a contract, its effect upon price maintenance has been as efficacious as if a contract had been entered into. The legality of the method thus adopted has been completely sustained by Judge Waddill. The decision is all the more significant because it follows upon a series of injunctions issued by the Federal Trade Commission prohibiting the use of such methods. Of course, the statute creating the Federal Trade Commission gives it power to enjoin not only acts prohibited by law, but practices which it may consider 'unfair.' The Federal Trade Commission's rulings, however, are based, in part, at any rate, on findings that such practices are contrary to law. As to such findings, the Federal Trade Commission has been overruled, and the decision of the court is paramount. The Federal Trade Commission may, perhaps, continue to

grant such injunctions on the ground of unfairness, but its jurisdiction to do this is questionable, and it would be a doubtful policy on its part to invite a discussion of its power to transcend the law as laid down by the courts. The manufacturers of many proprietary articles have, naturally, for some time been much disturbed about the legality of their selling methods, and they are to be congratulated upon a decision which removes all doubt and permits them to sell according to principles justified by sound economics."

FORMULA DISCLOSURE CASE DECIDED IN FAVOR OF E. FOUGERA & CO.

By a decision of the Court of Appeals of the State of New York, all judges concurring in the result, the judgment of the Appellate Division of the Supreme Court in permanently enjoining the enforcement of the so-called "formula disclosure" ordinance, has been sustained.

The Goldwater ordinance (New York) was enacted in December 1914, and required either the disclosure of the ingredients on a package, or the filing of the names of the ingredients with the (New York) Department of Health. The ordinance was to have become effective January 1, 1916, but bills for an injunction were filed in the Supreme Court. It was then agreed to submit the points claimed by the Board of Health and by E. Fougera & Co. to the Appellate Division of the Supreme Court, which held that the ordinance was in violation of the State constitution in that it did not constitute a reasonable exercise of the police powers. The city appealed to the Court of Appeals, with the result now reported.

CHANGES OF ADDRESS.

All changes of address of members should be sent to the General Secretary promptly.

The Association will not be responsible for non-delivery of the Annual Volume or Year Book, or of the JOURNAL unless notice of the change of address is received before shipment or mailing.

Both the old and the new address should be given thus:

HENRY MILTON,
From 2342 Albion Place, St. Louis, Mo.
To 278 Dartmouth St., Boston, Mass.

Titles or degrees to be used in publications or in the official records should be given, and names should be *plainly* written, or typewritten.

(*Continued from p. 930, October issue.*)

MULFORD, H. K.
From 212 Pembroke Ave., Wayne, Penna.
To Camp Devens, Mass.

BURKETT, K. S.
From 1620 Antrim St., Pittsburgh, Pa.
To 1613 8 Ave., Altoona, Pa.

FAULKNER, JOHN W.
From 5207 S. Warner St., Tacoma, Wash.
To 5224 S. Birmingham St., Tacoma, Wash.

GIDLEY, W. F.
From 123 Russell St., La Fayette, Ind.
To 250 Hillside Ave., Jamaica, Long Island, N. Y.

THURSTON, AZOR
Room 320 17th St., Columbus, Ohio.
To 2018 N. High Ave., Columbus, Ohio.

TABER, JOSEPH M.
From Elko Co. Hosp., Elko, Nev.
To care Wilson Drug Co., Reno, Nev.

SCHLEUTER, ROBERT E.
From 514 Metrop. Bldg., St. Louis, Mo.
To Base Hosp., Camp Hancock, Augusta, Ga.

JOPLING, JOHN C.
From 310 N. Illinois St., Indianapolis, Ind.
To P. O. Box 613, Indianapolis, Ind.

MCWILLIAMS, HERSCHEL B.
From 1100 Grand Ave., Washington, Ind.
To School of Ph., Corvallis, Ore.

BLANK, H. C.
From Lexington Court, Carnegie, Pa.
To Wilson, Pa.

GAHN, HENRY
From Pensacola Quarantine, Pensacola, Fla.
To Marine Hosp., Wilmington, N. C.

WILLIAMS, S. A.
From Elm St., Troy, Ala.
To Box 224, Troy, Ala.

MACKENZIE, R. H.
From 2340 Dahlia St., Denver, Colo.
To Leadville, Colo.

STOCKING, C. H.
From 448 Bancroft Ave., Indianapolis, Ind.
To 438 Harvard St., Indianapolis, Ind.

NORTH, SERG. HERMAN H.
From Early Treatment Station, 12 Clay St.
To Early Treatment Station 31, South Warren St., Trenton, N. J.

HOFFER, R. R.
From 2332 W. Jefferson Ave., Detroit, Mich.
To 2260 W. Jefferson Ave., Detroit, Mich.

BUSCH, H. P.
From The Gladstone, 11th & Pine Sts., Philadelphia, Pa.
To 1006 Spruce St., Philadelphia, Pa.

NORRIS, WM. P.
From 14 South Sacramento Blvd., Chicago, Illinois.
To 2509 Western Ave., Peoria, Ill.

RABINOWITZ, WM. J.
From care A. Daily, Rosenberg, Texas.
To Simonton, Texas.

HUNT, F. L.
From 5 Brown Ave., Chicago, Ill.
To care Multnomah Lumber & Box Co., Portland, Ore.

BARNSTEAD, S. O.
Fron New Lebanon, N. Y.
To care Wm. S. Merrell Chem. Co., 340 McGregor Ave., Cincinnati, O.

KAPLAN, S. S.
From 1646 W. 47th St., Chicago, Ill.
To 4959 Ashland Ave., Chicago, Ill.

MERNER, P. M. P.
From 89 Auburn Ave., Sierra Madri, Cal.
To 707 Addison St., Palo Altò, Cal.

PUREL, V. H.
From 2632 Gov. Nicholls St., New Orleans, La.
To 2936 Ursuline Ave., New Orleans, La.

SMITH, WM. M.
From 1720 Green St., Philadelphia, Pa.
To Trevorton, Pa.

EATON, E. O.
From 11 Winan St., East Orange, N. J.
To 972 Sutter St., San Francisco, Cal.

FISK, F. E.
From 116 E. 39th St., Indianapolis, Ind.
To 4926 Park Ave., Indianapolis, Ind.

LEAVITT, A. J.
From 900 W. Lake, Pasadena, Cal.
To 537 No. Chester Ave., Pasadena, Cal.

HERETH, F. S.
From Richmond, Cal.
To P. O. Box 7, Berlin, N. H.

EDISON, F. V.
From Thomasville, Ga.
To H. A. 2nd Class Navy Yard, Navy Dispensary, Charleston, S. C.

WITT, CHAS. A.
From 2212 Sedgwick St., Chicago, Ill.
To 309 Huntington Ave., Boston, Mass.

STRAWN, M. E. (MISS)
From 213 St. Clair Ave., Detroit, Mich.
To 459 Pennsylvania Ave., Indianapolis, Ind.

RHODEHAMEL, H. W.
From 638 E. 48th St., Indianapolis, Ind.
To 3323 College Ave., Indianapolis, Ind.

BAUM, F. C.
From Hosp., Ft. Slocum, N. Y.
To Trs. 99, Hosp., Ft. Slocum, N. Y.

WHITMORE, GEO. C.
From 601 Harrison Ave., Leadville, Colo.
To care Scholtz Drug Store, Denver, Colo.

MEAD, H. D.
From Wyncote, Pa.
To Woodstown, N. J.

BAIER, A. E.
From 322 Liberty Ave., Alliance, Ohio.
To Base Hosp. No. 27, A. P. O. Via New York, France.

CHASE, W. M.
From Base Hosp., Camp Custer, Mich.
To 1st Lieut. San. Corps, Camp Medical Supply Office, Camp Wadsworth, S. C.

CRAIG, H.
From care Frederick Stearns Co.
To care Nyal Co., Detroit, Mich.

PIGOTT, D. D.
From Hattiesburg, Miss.
To care Mrs. M. E. Pigott, R. F. D. No. 7, Tylertown, Miss.

DECEASED.

SCHMIDT, F. M.
5 Wabash Ave., Chicago, Ill.

KRAMER, J. E.
195 Exchange St., Rochester, N. Y.

LATHAM, THOMAS
1309 3rd St., New York, N. Y.

GALLAGHER, J. C.
446 Grove St., Jersey City, N. J.

BOOK NOTICES AND REVIEWS.

The United States Public Health Service has just issued the following publication:

HYGIENIC LABORATORY BULLETIN NO. 112.

I. *Phenols as Preservatives of Antipneumococci Serum.*—A Pharmacological Study. By Carl Voegtlin. Reports results of experiments made to determine the suitability of trikresol and phenol as preservatives in antipnuemococcic serum.

II. *The Nature of Contaminations of Biologic Products.* By Ida A. Bengston. A study of the various contaminating organisms found in different classes of biologic products.

III. *The Effect of Ether on Tetanus Spores and on Certain Other Microörganisms.* By H. B. Corbitt. Report of observations made showing that ether can not be relied upon to kill tetanus spores in vaccine virus.

This publication costs the Government considerable money and copies will be sent only to those making specific request for the same, and will not be distributed automatically as heretofore to all names appearing on the Bureau mailing list.

Proceedings Seventh Annual Meeting of American Drug Manufacturers' Association.—The Proceedings of the Seventh Annual Meeting of the American Drug Manufacturers' Association, held January 29 and 30, 1918, has just been issued. It is a book of about 350 pages and contains as frontispiece a picture of the late Henry J. Woodward, of Allaire Woodward & Co., Peoria, Ill. There are also inserts of the speakers and invited guests of the smoker and the banquet given at the Waldorf-Astoria. The address by Prof. Henry Kraemer, "Kultur *vs.* Culture," was delivered at the smoker. It was illustrated by stereopticon slides and received much favorable comment, and thereafter printed in several pharmaceutical publications. The speakers at the banquet were Hon. Abram I. Elkus, U. S. Ambassador to Turkey; Hon. Theodore E. Burton, ex-Senator, and Rt. Rev. Charles S. Burch, Bishop Suffragen of the Diocese of New York. These instructive addresses add value to the book as a library volume. Another interesting address was delivered by Dr. Fred B. Kilmer on the subject "After the War—What?"

The address of President Chas. J. Lynn comprised a review of drug activities and legislation, discussing various subjects at considerable length. The reports of other officers and committees are likewise of value, but the greatest interest to the greater number of this Association is that of the Committee on Standards, which with discussion on the topics occupies about one hundred pages. This report should have a wider distribution.

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